NOTE

This Microfiche meets the quality requirements of the American National Standard for Microfiche of Documents (ANSI PH5.9-1975). However, because of imperfections in the document from which it was made, it contains images that are illegible or difficult to read. The source document for this microfiche is the best copy that could be obtained prior to filming.

Congressional Information Service, Inc.

THE ROLE OF THE FEDERAL GOVERNMENT IN HUMAN NUTRITION RESEARCH

JOINT HEARING

BEFORE THE

SUBCOMMITTEE ON
SCIENCE, RESEARCH AND TECHNOLOGY

OF THE

COMMITTEE ON
SCIENCE AND TECHNOLOGY

AND THE

SUBCOMMITTEE ON DEPARTMENT OPERATIONS,
RESEARCH, AND FOREIGN AGRICULTURE

OF THE

COMMITTEE ON AGRICULTURE
U.S. HOUSE OF REPRESENTATIVES

NINETY-EIGHTH CONGRESS

FIRST SESSION

JULY 14, 1983

[No. 35]

(Committee on Science and Technology)

Serial No. 98-24

(Committee on Agriculture)

U.S. GOVERNMENT PRINTING OFFICE
26-987 O WASHINGTON : 1983

H161-33
H701-89

COMMITTEE ON SCIENCE AND TECHNOLOGY

DON FUQUA, Florida, *Chairman*

ROBERT A. ROE, New Jersey
GEORGE E. BROWN, Jr., California
JAMES H. SCHEUER, New York
RICHARD L. OTTINGER, New York
TOM HARKIN, Iowa
MARILYN LLOYD, Tennessee
DOUG WALGREN, Pennsylvania
DAN GLICKMAN, Kansas
ALBERT GORE, Jr., Tennessee
ROBERT A. YOUNG, Missouri
HAROLD L. VOLKMER, Missouri
BILL NELSON, Florida
STAN LUNDINE, New York
RALPH M. HALL, Texas
DAVE McCURDY, Oklahoma
MERVYN M. DYMALLY, California
PAUL SIMON, Illinois
NORMAN Y. MINETA, California
RICHARD J. DURBIN, Illinois
MICHAEL A. ANDREWS, Texas
BUDDY MacKAY, Florida
TIM VALENTINE, North Carolina
HARRY M. REID, Nevada
ROBERT G. TORRICELLI, New Jersey
FREDERICK C. BOUCHER, Virginia

LARRY WINN, Jr., Kansas
MANUEL LUJAN, Jr., New Mexico
ROBERT S. WALKER, Pennsylvania
WILLIAM CARNEY, New York
F. JAMES SENSENBRENNER, Jr., Wisconsin
JUDD GREGG, New Hampshire
RAYMOND J. McGRATH, New York
JOE SKEEN, New Mexico
CLAUDINE SCHNEIDER, Rhode Island
BILL LOWERY, California
ROD CHANDLER, Washington
HERBERT H. BATEMEN, Virginia
SHERWOOD L. BOEHLERT, New York
ALFRED A. McCANDLESS, California
TOM LEWIS, Florida

J. H. Poore, *Executive Director*
Robert C. Ketcham, *General Counsel*
Regina A. Davis, *Administrator*
David S. Jeffery, *Minority Staff Director*

Subcommittee on Science, Research and Technology

DOUG WALGREN, Pennsylvania, *Chairman*

GEORGE E. BROWN, Jr., California
DAVE McCURDY, Oklahoma
MERVYN M. DYMALLY, California
NORMAN Y. MINETA, California
BUDDY MacKAY, Florida
ROBERT G. TORRICELLI, New Jersey
STAN LUNDINE, New York
PAUL SIMON, Illinois
RICHARD J. DURBIN, Illinois
TIM VALENTINE, North Carolina
HARRY M. REID, Nevada
FREDERICK C. BOUCHER, Virginia

JUDD GREGG, New Hampshire
SHERWOOD L. BOEHLERT, New York
F. JAMES SENSENBRENNER, Jr., Wisconsin
RAYMOND J. McGRATH, New York
JOE SKEEN, New Mexico
HERBERT H. BATEMAN, Virginia

COMMITTEE ON AGRICULTURE

E (KIKA) de la GARZA, Texas, *Chairman*

THOMAS S. FOLEY, Washington,
Vice Chairman
WALTER B. JONES, North Carolina
ED JONES, Tennessee
GEORGE E. BROWN, Jr., California
CHARLES ROSE, North Carolina
JIM WEAVER, Oregon
TOM HARKIN, Iowa
BERKLEY BEDELL, Iowa
GLENN ENGLISH, Oklahoma
LEON E. PANETTA, California
JERRY HUCKABY, Louisiana
DAN GLICKMAN, Kansas
CHARLES WHITLEY, North Carolina
TONY COELHO, California
TOM DASCHLE, South Dakota
CHARLES W. STENHOLM, Texas
HAROLD L. VOLKMER, Missouri
CHARLES HATCHER, Georgia
ROBIN TALLON, South Carolina
HARLEY O. STAGGERS, Jr., West Virginia
RICHARD J. DURBIN, Illinois
LANE EVANS, Illinois
ROBERT LINDSAY THOMAS, Georgia
JAMES R. OLIN, Virginia
TIMOTHY J. PENNY, Minnesota

EDWARD R. MADIGAN, Illinois,
Ranking Minority Member
JAMES M. JEFFORDS, Vermont
E. THOMAS COLEMAN, Missouri
RON MARLENEE, Montana
LARRY J. HOPKINS, Kentucky
GEORGE HANSEN, Idaho
ARLAN STANGELAND, Minnesota
PAT ROBERTS, Kansas
BILL EMERSON, Missouri
JOE SKEEN, New Mexico
SID MORRISON, Washington
STEVE GUNDERSON, Wisconsin
COOPER EVANS, Iowa
GENE CHAPPIE, California
WEBB FRANKLIN, Mississippi

Professional Staff

A. Mario Castillo, *Staff Director*
Robert M. Bor, *Chief Counsel*
John E. Hogan, *Minority Counsel*
Bernard Brenner, *Press Secretary*

Subcommittee on Department Operations, Research, and Foreign Agriculture

GEORGE E. BROWN, Jr., California, *Chairman*

HARLEY O. STAGGERS, Jr., West Virginia
TIMOTHY J. PENNY, Minnesota
LEON E. PANETTA, California
THOMAS S. FOLEY, Washington
TONY COELHO, California
HAROLD L. VOLKMER, Missouri
JAMES R. OLIN, Virginia

PAT ROBERTS, Kansas
STEVE GUNDERSON, Wisconsin
COOPER EVANS, Iowa
WEBB FRANKLIN, Mississippi

CONTENTS

WITNESSES

July 14, 1983: Page

Hon. Edward N. Brandt, Jr., M.D., Ph. D., Assistant Secretary for Health, U.S. Department of Health and Human Services, accompanied by James B. Wyngaarden, M.D., Director, National Institutes of Health; Manning Feinleib, M.D., Dr., P.H., Director, National Center for Health Statistics; and Stanford A. Miller, Ph. D., Director, Bureau of Foods, Food and Drug Administration ... 19

Hon. Richard E. Lyng, Deputy Secretary, U.S. Department of Agriculture, accompanied by Mary C. Jarratt, Assistant Secretary for Food and Consumer Services; Orville G. Bentley, Ph. D., Assistant Secretary for Science and Education; Isabel Wolf, Administrator, Human Nutrition Information Service; and Donald Therriault, Ph. D., Associate Director, ARS Human Nutrition Research Center ... 68

Malden C. Nesheim, Ph. D., director, division of nutritional sciences, Cornell University; Irwin H. Rosenberg, M.D., professor of medicine, University of Chicago Medical Center; Gilbert A. Leveille, Ph. D., director, Nutrition and Health Sciences, General Foods Corp.; and H. David Hurt, Ph. D., chairman, National Nutrition Consortium, Inc ... 126

APPENDIXES

Appendix A.—DHHS followup questions and answers ... 197

Appendix B.—USDA followup questions and answers ... 205

Appendix C—Report of the evaluation of Clinical Nutrition Research Units, fiscal year 1982 ... 257

THE ROLE OF THE FEDERAL GOVERNMENT IN HUMAN NUTRITION RESEARCH

THURSDAY, JULY 14, 1983

House of Representatives, Committee on Science and Technology, Subcommittee on Science, Research and Technology; Committee on Agriculture, Subcommittee on Department Operations, Research, and Foreign Agriculture,

Washington, D.C.

The joint hearing met, pursuant to call, at 9:35 a.m., in room 2325, Rayburn House Office Building, Hon. Doug Walgren (chairman of the Subcommittee on Science, Research and Technology) presiding.

Mr. Walgren. Today we start the third annual Human Nutrition Research oversight hearing held jointly by the Subcommittee on Science, Research, and Technology of the Science and Technology Committee, and the Subcommittee on Department Operations, Research, and Foreign Agriculture of the Agriculture Committee.

Our hearing today will focus on the views of the administration and the nutrition community regarding the role of the Federal Government in human nutrition research and how effectively that role is being fulfilled.

A clear definition of the appropriate role of the Federal Government is fundamental to the establishment of prudent nutrition research policies and programs in such an interdisciplinary science as this. And the Congress wants to play its role in trying to set that policy and review how the executive branch of Government responds in implementing that policy.

During the previous 2 years the administration has assured us that nutrition research was receiving high priority. In some instances there has been advancement, yet the status of several important activities has not advanced at all since last year.

For example, rather than conducting a review of the USDA Human Nutrition Research Centers by the Board of Scientific Counselors, the Board was terminated. It is also disappointing that the evaluation committee of the National Nutrition Monitoring System has simply not been convened.

We realize that these are areas that involve a lot of different agencies; the pulling together of people who have different focuses for their roles in the Government. On the other hand, there is nothing more important in the long run than the question of nutrition. We do feel it is one that has not had the appreciation by many levels of our society that it clearly deserves.

It is also one that runs very directly into some special interests that we all know in our system play a major role. It is incumbent on all of us to see that we are not diverted from assuring the right effort is being made in this area.

We do recognize that progress has been made, yet it is clear that numerous questions remain before us. We wonder whether policymakers, and we include the Congress in that, have paid adequate attention to nutrition research priorities and the training of nutrition manpower to insure that long-range research needs can be met. We wonder whether nutrition research is benefiting as it could from the development of Government and industry and academic partnerships.

Does the present Federal structure provide adequate focus and stability for both basic and applied research in the nutrition area? And that includes social and behavioral aspects of the impact of proper nutrition.

Are new congressional initiatives needed to insure that innovative programs such as the Department of Health and Human Services Clinical Nutrition Research Units and the Department of Agriculture's competitive grants programs do not follow the fate of the National Science Foundation's nutrition program, which we now view as too lean and too short-lived to achieve its potential?

The answer to one question which we raised several years ago is disappointingly clear. We were interested in what role the Office of Science and Technology Policy could play in this area. We felt that guiding the Federal Government's role in its responsibility in areas that are as complex as this was the very reason that OSTP was established in the Executive Office. And yet, without seeking any advice from scientists, any advice from the parent committees on health and agriculture that are related and concerned with the Office of Science and Technology Policy, or any advice from the congressional committees represented here today, Dr. Keyworth abruptly terminated the Joint Subcommittee on Human Nutrition Research in that body.

While these are some of the problems, we will be interested to learn from the witnesses today how they view the health and the well-being of human nutrition research and our effort on the Federal level, and how all sectors of society can develop a partnership that can fulfill the contributions that we ought to be making, each of us, in our own areas in this particular effort.

[The opening statement of Hon. Doug Walgren follows:]

OPENING STATEMENT

HON. DOUG WALGREN

THE ROLE OF THE FEDERAL GOVERNMENT IN HUMAN NUTRITION RESEARCH

JULY 14, 1983

TODAY BEGINS THE THIRD ANNUAL HUMAN NUTRITION RESEARCH OVERSIGHT HEARING HELD JOINTLY BY THE SUBCOMMITTEE ON SCIENCE, RESEARCH AND TECHNOLOGY AND THE SUBCOMMITTEE ON DEPARTMENT OPERATIONS, RESEARCH AND FOREIGN AGRICULTURE. OUR HEARING TODAY WILL FOCUS ON THE VIEWS OF THE ADMINISTRATION AND THE NUTRITION COMMUNITY REGARDING THE ROLE OF THE FEDERAL GOVERNMENT IN HUMAN NUTRITION RESEARCH AND HOW EFFECTIVELY THAT ROLE IS BEING FULFILLED. A CLEAR DEFINITION OF THE APPROPRIATE ROLE OF THE FEDERAL GOVERNMENT IS FUNDAMENTAL TO THE ESTABLISHMENT OF PRUDENT NUTRITION RESEARCH POLICIES, PRIORITIES AND PROGRAMS IN THIS IMPORTANT INTERDISCIPLINARY SCIENCE.

DURING THE PREVIOUS TWO HEARINGS THE ADMINISTRATION HAS ASSURED US THAT NUTRITION RESEARCH WAS RECEIVING HIGH PRIORITY, YET THE STATUS OF SEVERAL IMPORTANT ACTIVITIES HAS NOT ADVANCED SINCE LAST YEAR. FOR EXAMPLE: RATHER THAN CONDUCTING A REVIEW OF THE USDA HUMAN NUTRITION RESEARCH CENTERS BY THE BOARD OF SCIENTIFIC COUNSELORS, THE BOARD WAS TERMINATED; AND THE EVALUATION COMMITTEE OF THE NATIONAL NUTRITION MONITORING SYSTEM HAS NOT BEEN CONVENED.

ALTHOUGH WE RECOGNIZE THAT PROGRESS HAS BEEN MADE, NUMEROUS QUESTIONS REMAIN BEFORE US. HAVE POLICYMAKERS, INCLUDING THE CONGRESS, PAID ADEQUATE ATTENTION TO NUTRITION RESEARCH PRIORITIES AND THE TRAINING OF NUTRITION MANPOWER TO INSURE THAT LONG-RANGE RESEARCH NEEDS CAN BE

MET? COULD NUTRITION RESEARCH BENEFIT FROM THE DEVELOPMENT OF GOVERNMENT/INDUSTRY/ACADEMIC PARTNERSHIPS? DOES THE PRESENT FEDERAL STRUCTURE PROVIDE ADEQUATE FOCUS AND STABILITY FOR BASIC AND APPLIED RESEARCH, INCLUDING THE SOCIAL AND BEHAVIORAL ASPECTS? ARE NEW CONGRESSIONAL INITIATIVES NEEDED TO INSURE THAT INNOVATIVE PROGRAMS, SUCH AS THE DHHS CLINICAL NUTRITION RESEARCH UNITS AND THE USDA COMPETITIVE GRANTS NUTRITION PROGRAM DO NOT FOLLOW THE FATE OF THE NSF NUTRITION PROGRAM, WHICH WAS TOO LEAN AND SHORT-LIVED TO ACHIEVE ITS FULL POTENTIAL.

HOWEVER, THE ANSWER IS CLEAR TO ONE QUESTION WHICH I RAISED IN MY OPENING REMARKS TWO YEARS AGO -- "WHAT WILL BE THE ROLE OF OSTP?" GUIDING THE FEDERAL GOVERNMENT'S ROLE, RESPONSIBILITY AND POLICY FOR COMPLEX ISSUES, SUCH AS NUTRITION, WHICH CUT ACROSS NUMEROUS DEPARTMENTS IS THE VERY REASON OSTP WAS ESTABLISHED IN THE EXECUTIVE OFFICE. YET, WITHOUT SEEKING ADVICE FROM THE SCIENTISTS, THE OSTP PARENT COMMITTEES ON HEALTH AND AGRICULTURE, OR THE CONGRESSIONAL COMMITTEES REPRESENTED HERE TODAY, DR. KEYWORTH ABRUPTLY TERMINATED THE JOINT SUBCOMMITTEE ON HUMAN NUTRITION RESEARCH.

WE WILL BE INTERESTED TO LEARN FROM OUR WITNESSES TODAY, HOW THEY VIEW THE HEALTH AND WELL-BEING OF HUMAN NUTRITION RESEARCH AND HOW ALL SECTORS OF SOCIETY CAN DEVELOP A PARTNERSHIP TO FULFILL THEIR RESPECTIVE ROLES.

Mr. **Walgren**. With that, let me turn to Congressman Brown for any opening comments he may have, both from the view of the Science and Technology Committee, but more specifically as chairman of the subcommittee on the Agriculture Committee with jurisdiction in this area. Mr. Brown.

Mr. **Brown**. Thank you very much, Mr. Chairman.

There is not much I can add to what you have already stated. Both of our subcommittees have longstanding interest and jurisdictional responsibility in the area of nutrition research, and we have used these hearings as a means of providing some degree of congressional monitoring over the activities that are going on.

I share with you a slight feeling of discomfort that our concern for improved coordination in the area of nutrition research has not yet seemed to result in an executive branch consensus on what the proper way to approach this problem is. Hopefully we will hear more about the changes that you have referred to in the testimony of the witnesses this morning.

It has been a longstanding interest of mine that the executive branch find ways to look at this problem of coordinating complex interagency programs as the generic problem. It is not just nutrition, as all of you know, it extends into many different areas.

If I had my druthers I would suggest that you have a confident scientist in the field of bureaucratic management involved in each one of these efforts to look at it as a process, and how to make the process function more adequately; then write a nice paper on it and we could all benefit from what we had learned.

I don't think that is likely to happen but, nevertheless, I still think it is a good idea.

I have received some additional statements from the Association of State and Territorial Public Health Nutrition Directors and from the State of Michigan Department of Public Health regarding the subject of our hearings today and I would like to request unanimous consent to insert these statements in the record, if I may, Mr. Chairman.

Mr. **Walgren**. Without objection.

[The statements mentioned above follow:]

THE ASSOCIATION OF STATE AND TERRITORIAL
PUBLIC HEALTH NUTRITION DIRECTORS

Please Reply To

Susan B. Foerster, RD, MPH
Office of Special Projects
California Department of
Health Services
714 P Street
Sacramento, CA 95814
(916)324-2233 or 324-2281

July 9, 1983

The Honorable George E. Brown, Jr.
Chairman, Subcommittee on Department
Operations, Research and Foreign
Agriculture
Agriculture Committee
U.S. House of Representatives
Washington, D.C. 20515

Dear Mr. Brown:

RE: Role of the Federal Government in Human Nutrition Research

The Association of State and Territorial Public Health Nutrition Directors (ASTPHND) shares the concern of the Agriculture Committee and the Committee on Science and Technology on the subject of federal leadership in human nutrition research, the focus of your hearing on July 14. We are appreciative of the attention you have maintained on this fundamental subject.

This Association, an affiliate of the Association of State and Territorial Public Health Officials (ASTHO), is composed of directors and State designees for public health nutrition in the 50 States and seven Territories. Thus, we are in an intermediary position between federal and local government, and we interact with all elements of nutrition interest: medical schools, schools of public health, non-profic agencies, foundations, and private, for-profit firms. Our responsibilities include monitoring the nutritional problems of our State's population; developing, implementing and evaluating nutrition service programs; and maintaining accountability for the expenditure of public funds in our area of responsibility. We are in continual contact with agencies of USDA and HHS, both nationally and in our State. From this experience, we wish to share our views on the subject of this hearing.

Public health nutrition is founded upon basic nutritional and medical sciences; but in addition, since its mission is to improve the health of population groups through better dietary intake, it depends just as heavily upon the behavioral sciences. These include education, sociology, psychology and the epidemiology of how people eat. We are vitally involved with changesin diet and nutritional health due to secular trends and in what methods are most effective in influencing dietary habits for the better.

ASTPHND is increasingly concerned about the growing disparity between basic nutrition knowledge and its application to people. Current scientific evidence suggests that there may be deficiencies in major and micro-nutrients in significant segments of our population, a dramatic potential for chronic disease prevention through dietary change, and a fundamental interaction between nutrition and mental health. The application of such knowledge to health policy is a vital link between science and its application to people through public health efforts. Examples of such application include the development of major publications about nutrition, pregnancy and child health which have been funded under the auspices of Maternal and Child Health, Title V, research monies over an extended period of time. These publications have focused public health efforts and resulted in giant strides toward improved pregnancy outcome and better child health. We are most apprehensive that resources in this area are diminishing, or they have disappeared entirely.

Public health nutrition requires a population data base containing information about nutritional status, including dietary intake, of the entire population and of high risk subgroups. Such data are now avaiable nationally principally through the Health and Nutrition Examination Survey (HANES) and the U.S.D.A. Food Consumption Survey (FCS). Reports generated from these surveys quantify problems and thereby assist planners to monitor change and better direct scarce resources.

In addition, we are in desperate need of improved survey and statistical methods that provide subnational area data. For example, we would like to meet the nutrition targets described in the HHS 1990 Objectives for the Nation, but it is reality that the great majority of States have no means for determining even baseline measures. ASTPHND is beginning to work on this problem, but without resources for such "applied research", our chances of success are not high.

It is our view that HANES and the FCS could, and should, become required federal research surveys, to be sceduled and budgeted at reasonable intervals, and mandated to develop improved survey methods that would not only increase the utility of the data to State and local users but also advance the state-of-the-art for economic small surveys in States and other smaller areas.

Many States participate in the Nutrition Surveillance Program of the U.S. Centers for Disease Control, and those who do find it invaluable for program management and planning. It also has the potential for expansion to include more population groups and add more nutritional health outcome measures, including dietary indices. However, States are experiencing increased difficulty maintaining their level of support for its operation, and new States find it difficult to afford joining the Program. This CDC Program should be funded to permit more epidemiologic research and to provide for coopeative agreements for additional State participation.

In addition, in at least a half a dozen States, anecdotal reports of malnutrition have come from medical centers and church groups. It is an embarrassment to States that no rapid methods of investigating such problems are avaialble. Surely, this cannot be excused in a country with enough technology to send a space vehicle entirely out of our solar system!

These are problems of basic and applied nutrition research faced by States. While we stand ready to assist as advisors and collaborators, we depend upon federal leadership and resources in these areas. States and localities are unable to assume this role, and within the private sector it is difficult to envision any appropriate segment that would support sustained, incremental committment to these needs. Clearly, this area is one in which the federal government must maintain and better organize its efforts, including strengthening the participation of States.

The Association of State and Territorial Public Health Nutrition Directors has welcomed this opportunity to share its concerns and applauds the Agriculture and Science and Technology Committees for their continued vigilance. Please call on us if we can provide further information.

Respectfully,

Susan B. Foerster

Susan B. Foerster, RD, MPH
Chair, ASTPHND Data Committee

STATE OF MICHIGAN

JAMES J. BLANCHARD, Governor

DEPARTMENT OF PUBLIC HEALTH

3500 N. LOGAN
P.O. BOX 30035, LANSING, MICHIGAN 48909
GLORIA R. SMITH, Ph.D., M.P.H., F.A.A.N., Director

July 8, 1983

The Honorable Doug Walgren, Chairman
Subcommittee on Science, Research & Technology
The Honorable George E. Brown, Jr., Chairman
Research & Foreign Agriculture
Rayburn House Office Building
Washington, DC 20515

JUL 13 1983

Dear Congressmen Walgren and Brown:

Your joint hearing on "The Role of the Federal Government in Human Nutrition Research" may be another beginning step toward achieving a greater federal commitment for continuous exploration in the area of human nutrition research. I think that there is a definite responsibility for the federal government to conduct both basic and applied research in nutrition.

As all of us associated with government realize, health care cost containment is a major public concern. Nutrition status is clearly associated with health, productivity and the quality of life of citizens.

National nutrition research is required in a multiplicity of forms, but basic to public health service delivery for health promotion and disease prevention is a national nutrition monitoring system.

It is clearly the role of the federal government to monitor the food, nutrition and health status of the nation. This responsibility can be achieved by improving survey methodology, disseminating findings in a timely manner, conducting nutrition epidemiological investigations, maintaining and distributing nutrient data bank information and periodically studying especially vulnerable subgroups of the population. State and local governments may be able to conduct localized monitoring within their jurisdictions but only if acceptable nationally methodology, reference population standards and nutrient information is readily accessible.

In 1978 Michigan's public health law included the state responsibility of establishing "a comprehensive health information system providing for the collection, compilation, coordination, analysis indexing, dissemination and utilization of both purposefully collected and extant health-related data and statistics. The health information system shall include statistics relative to: . . . determinants of health and nutritional practices and status, including behavior related to health . . .". The declining Michigan economy and the limited technical assistance available in this area are constraints in implementing this state mandate. We have attempted various pilot efforts in the area of nutrition practices and health status but lack the resources and nutrient composition data to engage widely in this activity. We have participated in CDC Pediatric Nutrition Surveillance since 1977 but have no statewide data on our expanding adult population related to nutrition status nor any dietary practices data for the population. Thus, we rely heavily on findings from NHANES and NFCS and discussions with developers of the federal nutrient data banks for nutrition status trends.

It is crucial that the federal government move forward in its development and enhancement of human nutrition and food research. Whenever possible, industry and the private health care sector should contribute to this effort but the monitoring of the population and its food supply must remain a federal responsibility. Given adequate national tools and resource access, states and localities will be in a better position to identify community needs and implement services to improve the health of the population.

We look forward to a congressional mandate and appropriations for national nutrition monitoring.

Sincerely,

Molly A. Graber

Molly A. Graber, M.S., R.D.
Chief of Nutrition Services
Health Promotion and Disease
Prevention Administration

Mr. BROWN. I would like to request unanimous consent that an opening statement by the Honorable Leon Panetta, a member of the Agriculture Subcommittee, also, be inserted at this point. He is the chairman of the Agriculture Subcommittee dealing with aspects of the agriculture food stamp program.

Mr. WALGREN. Without objection.

[The opening statement of Hon. Leon Panetta follows:]

OPENING STATEMENT OF HONORABLE LEON PANETTA
JOINT HEARING ON THE ROLE OF GOVERNMENT IN NUTRITION RESEARCH JULY, 14, 1983

Congressman Brown and Congressman Walgren, I applaud your leadership in defining the role of government in nutrition research. Permit me to add a couple of thoughts on the subject.

Nutrition research succeeds when the public can utilize the findings to improve the food supply, dietary habits, and the nation's health. We must nurture cooperation between scientists in the laboratories and scientists in the education and service fields. The Human Nutrition Information and Dietary Guidance staff at USDA has played an important role in translating laboratory findings into a useful form for public education. We must enlarge this role and ensure the flow of unbiased nutrition information to the public.

Secondly, the federal government needs to implement a legitimate, coordinated nutrition monitoring system. We must be able to anticipate problems of poor nutrition in this country, so we can intervene rapidly when a certain group is at risk.

Over the past several months, the Subcommittee on Domestic Marketing, Consumer Relations, and Nutrition, which I chair, has held a series of hearings in this city as well as across the country to gain an accurate account of the degree of hunger and possible reasons for its recent growth in this country. Witnesses citing ad hoc survey results or personal accounts reported increased infant mortality, rates, inadequate money for food purchases, dramatic increases in emergency requests for food, and evidence of poor nutritional status.

Yet, in a country which has the technology to measure the risk of cancer at a level of 1 part per 100 million, I'm alarmed we can not estimate, with some degree of confidence, the number of Americans whose current diets are inadequate in nutrients. To my chagrin, this nation lacks a coordinated monitoring system which could provide early warning signals of impending problems in nutritional status.

USDA periodically measures the nation's food consumption patterns and DHHS conducts a myriad of specialized monitoring activities. But, the long intervals between such surveys lessen their usefulness in the policy arena. Congress can better establish food policies and target limited resources to nutrition programs, if they have access to a continuous supply of information on the nutritional status of Americans.

For this reason, we included a provision on nutrition surveillance in H.R. 1590. This provision directs the Secretary of Agriculture to continue conducting surveillance of those groups at highest nutritional risk with particular attention to Socio-economic factors and participation in food assistance programs. With such information, Congress can more effectively allocate resources to programs that reduce hunger, prevent disease, and maintain good nutrition status. Evidence from today's hearing may suggest additional approaches in this area.

I question whether USDA remains committed to nutrition. I also question if certain congressional mandates have been fulfilled. Though a recent research plan of the Department includes an objective to promote optimum health and well-being through improved nutrition, I question the depth of this commitment.

Twenty-one months ago Deputy Secretary Lyng appeared before the Subcommittee on Nutrition to discuss the reorganization of the USDA Human Nutrition Center. At that time, I expressed concern that funding for human nutrition research and dietary guidance might be cut in subsequent budget requests. I also questioned whether the recent separation of ARS nutrition research activities from nutrition education and research activities in other parts of USDA would result in wasteful duplication or, worse, reduction of their national visibility. Unfortunately, I fear that my predictions at that time may now be realized.

I believe the focus of these hearings for the past two years has been to urge USDA and DHHS to complete a coordinated monitoring plan.

Part of this coordination may require, once again, centralizing, the nutrition research and education activities within USDA. Nutrition research and nutritional education must become more that paper priorities at USDA and DHHS. What we need is a commitment of adequate resources and an efficient management plan for research which allow the coordination necessary to implement a national nutrition monitoring system.

Clearly, it is time for Congress and for society to reassert why we established nutrition as a priority in the past and why it ought to remain a priority in terms of our policies today. Sound nutrition makes good sense not only for the strength of this society but also for the strength of this economy. Yet, as I have traveled throughout this country this year, I have heard testimony from physicians, nutritionists, government officials, and recipients about what happens when this country shifts its priorities away from nutrition.

The impact of what we have seen is that there is a problem out there and it is having some very tragic consequences. The reality is confirmed by reports of increases in low birth-weight babies, in anemia, in infant mortality, and in the numbers of people lined up for a free loaf of cheese. The tragedy, however, is that some of my colleagues are not convinced that these reports are real.

If it takes a continuous scientific survey to confirm the degree of poor nutritional health of Americans today, then let us commit the requisite resources and manpower. We must have undeniable facts to challenge our colleagues who claim that poverty-based hunger does not exist in the United States today.

Mr. Brown. That concludes my opening statement, Mr. Chairman.

[The opening statement of Hon. George E. Brown, Jr., follows:]

OPENING STATEMENT
HON. GEORGE E. BROWN, JR.

THE ROLE OF THE FEDERAL GOVERNMENT IN HUMAN NUTRITION RESEARCH

JULY 14, 1983

THE HEARINGS TODAY ARE A CONTINUATION OF OVERSIGHT BY THE AGRICULTURE AND SCIENCE COMMITTEES ON HUMAN NUTRITION RESEARCH. THEY ARE ALSO A PART OF THE DEPARTMENT OPERATIONS, RESEARCH, AND FOREIGN AGRICULTURE SUBCOMMITTEE'S CURRENT SERIES TO REVIEW THE SCIENCE AND EDUCATION ACTIVITIES OF USDA AND THE INTERRELATIONSHIP OF THOSE ACTIVITIES WITH PUBLIC AND PRIVATE SECTORS WHICH SPONSOR AND UTILIZE AGRICULTURE RESEARCH.

OUR SUBJECT TODAY, "THE ROLE OF THE FEDERAL GOVERNMENT IN HUMAN NUTRITION RESEARCH", WILL SET THE STAGE FOR FUTURE DISCUSSIONS REGARDING THE ROLE OF OTHER SECTORS OF SOCIETY IN ACHIEVING NUTRITION RESEARCH GOALS, WHAT THOSE GOALS SHOULD BE, WHO SHOULD AND WILL DEFINE THEM, AND HOW THE FEDERAL GOVERNMENT SHOULD ORGANIZE TO EFFECTIVELY MANAGE THEIR RESPONSIBILITY.

CAREFUL DEVELOPMENT, ANALYSIS, AND APPLICATION OF NUTRITION RESEARCH COULD WELL BE THE KEY TO INTEGRATING MEDICINE AND AGRICULTURE. NUTRITION RESEARCH COULD ALSO MAKE A SIGNIFICANT CONTRIBUTION TOWARD REDUCING THE APPARENT BARRIERS TO THE DEVELOPMENT OF COMPREHENSIVE

STRATEGIC PLANS FOR ACHIEVING SOCIETAL GOALS WHICH INCLUDE THE AVAILABILITY OF BOTH QUALITY FOOD AND HEALTH SYSTEMS, INCLUDING HEALTH PROMOTION. TO ACHIEVE THESE INTERRELATED GOALS, THERE IS NO QUESTION THAT NUTRITION CONSIDERATIONS MUST BE A COMPONENT OF AGRICULTURE RESEARCH AT THE PRODUCTION LEVEL AND BEYOND THE FARM GATE, AS WELL AS RESEARCH INTERFACING THE BIOMEDICAL, SOCIAL AND BEHAVIORAL SCIENCES. BUT, DO THE FEDERAL AGENCIES, INCLUDING NSF AND EPA, WHO CAN FACILITATE THIS INTERCHANGE ALSO HAVE MECHANISMS IN PLACE TO IMPLEMENT THE INTERCHANGE THROUGH THEIR RESEARCH INITIATIVES, AND EDUCATIONAL AND ADVISORY SYSTEMS?

A FEDERAL NUTRITION RESEARCH PLAN DEVELOPED AND ACCEPTED BY REPRESENTATIVES OF THE BROAD RANGE OF DISCIPLINES AND AGENCIES WHICH ENCOMPASS THE SCIENCE AND APPLICATION OF NUTRITION COULD PLAY A MAJOR ROLE IN THIS INTERCHANGE. AN IMPORTANT COMPONENT OF SUCH A PLAN IS THE OPPORTUNITY FOR PARTICIPATION BY THE ACADEMIC, PRIVATE, AND STATE AND LOCAL GOVERNMENT SECTORS. THIS COMPONENT IS NECESSARY TO DELINEATE THE PRIORITIES OF THESE GROUPS AND IDENTIFY THOSE ACTIVITIES WHICH THEY CAN PREPARE TO UNDERTAKE TO ACHIEVE NATIONAL GOALS. THIS PROCESS WILL ALSO ASSIST IN GAINING THEIR SUPPORT AND UNDERSTANDING OF THE FEDERAL PLAN AND THE PRIORITIES WHICH ARE IDENTIFIED AS THE NECESSARY AND PROPER ROLE OF THE FEDERAL GOVERNMENT IN HUMAN NUTRITION RESEARCH.

HOPEFULLY, SUCH A PLAN WOULD ALSO ASSIST THE CONGRESS AND THE EXECUTIVE BRANCH TO MOVE FROM TODAY'S PREOCCUPATION WITH BUDGETS AND ADMINISTRATION TO THE ROLE OF SCIENCE IN ADDRESSING THE NATION'S

ECONOMIC PROBLEMS AND ENHANCING THE QUALITY OF LIFE. THEREFORE, I WAS PLEASED THAT LAST JULY DR. KEYWORTH ACCEPTED FOR OSTP THE RECOMMENDATION OF THE MAY 1982 GAO REPORT THAT HE "DIRECT THE JOINT SUBCOMMITTEE ON HUMAN NUTRITION RESEARCH TO DEVELOP A FEDERAL NUTRITION RESEARCH PLAN". HOWEVER, I AM DISTURBED THAT HE TERMINATED THAT SUBCOMMITTEE LAST MONTH BEFORE EVEN THE FRAMEWORK FOR SUCH A PLAN OR AN ALTERNATIVE FOR CONSTRUCTING IT WAS IN PLACE.

IN MY VIEW, THE FUNCTIONS OF THIS SUBCOMMITTEE HAVE NOT BEEN COMPLETED. THE LEGISLATIVE INTENT OF THE FEDERAL COORDINATING COUNCIL FOR SCIENCE, ENGINEERING, AND TECHNOLOGY (FCCSET), UNDER WHICH THIS JOINT SUBCOMMITTEE WAS ESTABLISHED, WAS THE COORDINATION OF RELATED ACTIVITIES, RESEARCH, AND POLICY RESPONSIBILITIES WHICH FALL UNDER MORE THAN ONE FEDERAL AGENCY. BECAUSE OF THE COMPLEXITY OF THE TASK, AND NO DOUBT THE NEED TO DEFEND BIASES AND TURFS, THE JOINT SUBCOMMITTEE HAS BEEN BUILDING THE INFRASTRUCTURE FOR COORDINATION. IT APPEARS TO ME THAT A NUTRITION RESEARCH PLAN IS NECESSARY BEFORE THIS GROUP, OR ANY ALTERNATIVE, CAN EFFECTIVELY COORDINATE RESEARCH, NOT TO MENTION POLICY AMONG THE EIGHT FEDERAL AGENCIES INVOLVED.

WE LOOK FORWARD TO THE VIEWS OF OUR WITNESSES TODAY AND THEIR ADVICE ON HOW THE FEDERAL GOVERNMENT, INCLUDING THE CONGRESS, CAN EFFECTIVELY DEFINE, COMMUNICATE, AND COORDINATE ITS ROLE AND RESPONSIBILITIES IN HUMAN NUTRITION RESEARCH.

Mr. WALGREN. Thank you, Mr. Brown.

With that, let's turn to the panel from the Department of Health and Human Services. As you gentlemen know, your written statements will be made part of the record, without objection, and reprinted for the review of other members and the public in total.

We would encourage you to summarize or outline your statements in whatever way is most effective to make the points that you would like to underscore to the committees. We are very pleased that you would be here and make yourself available to us. We feel that it is an extremely important process and we appreciate your viewing it in the same light.

Dr. Brandt.

STATEMENT OF HON. EDWARD N. BRANDT, JR., M.D., Ph. D., ASSISTANT SECRETARY FOR HEALTH, U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES, ACCOMPANIED BY JAMES B. WYNGAARDEN, M.D., DIRECTOR, NATIONAL INSTITUTES OF HEALTH; MANNING FEINLEIB, M.D., Dr., P. H., DIRECTOR, NATIONAL CENTER FOR HEALTH STATISTICS, AND STANFORD A. MILLER, Ph. D., DIRECTOR, BUREAU OF FOODS, FOOD AND DRUG ADMINISTRATION

Dr. BRANDT. Thank you very much, Mr. Chairman, Mr. Brown.

I appreciate this opportunity to review with you the present and future directions for human nutrition research of the Department of Health and Human Services [DHHS], and also to review with you our national efforts to monitor nutritional status.

With me today are several officials of the Department who are closely associated with departmental activities in nutrition research, nutritional assessment and monitoring, and regulation of the food supply. To my far right, Dr. Manning Feinleib, Director of the National Center for Health Statistics; [NCHS] to my near right, Dr. James Wyngaarden, Director of the National Institutes of Health [NIH]; and to my left, Dr. Sanford Miller, Director of the Bureau of Foods of the Food and Drug Administration [FDA].

As you know, our Department has a vast array of activities important to improving our understanding regarding nutrition, as well as for applying that knowledge to efforts designed to enhance the nutritional well-being of the American people.

Last year, my testimony discussed research activities extensively. This year we will provide an overview of the planning and coordination of present and future directions in human nutrition research, including the development of research agendas, and we will emphasize the implementation of the Human Nutrition Research Information and Management System and the National Nutrition Monitoring System.

Turning to nutrition research, in fiscal year 1982, the Department expended $155 million for nutrition research, all of it in the Public Health Service.

In addition to this amount, the Centers for Disease Control [CDC] expended $2.6 million and the National Center for Health Statistics estimates an expenditure of $2.8 million on nutrition-related activities.

Our Department, along with the Department of Agriculture, has adopted a useful framework for discussing human nutrition activities which encompass studies in three major areas: biomedical and behavioral sciences, food sciences, and nutrition education. A word about each of these is in order.

Biomedical and behavioral sciences: Studies in these aspects of human nutrition research include the consequences of food or nutrient intake and its utilization by the intact organism as well as the metabolic and behavioral mechanisms involved. And specific examples are included in the complete testimony, Mr. Chairman.

With respect to food sciences, studies in the food sciences aspects of human nutrition research are primarily concerned with the nutritional quality, content, or composition of foods, or with the bioavailability of nutrients in foods.

Finally, research in nutrition education includes studies of dietary practices, food consumption patterns and their determinants, and studies on methods for informing and educating the public about nutrition, health and dietary practices.

The Department of Health and Human Services and the Department of Agriculture have adopted the seven critical goals identified in the 1980 report of the Joint Subcommittee on Human Nutrition Research and they are outlined, again, in my testimony.

These seven have been useful in the strengthening and coordination of the human nutrition research planning activities of the Department. Like USDA, we have developed structures and approaches within the Department to enhance nutrition coordination. This is reflected, for example, in the work of the Nutrition Policy Board.

Among the other mechanisms which have been useful in mapping the future direction and ongoing coordination of our human nutrition research program are the health promotion/disease prevention nutrition objectives of the eighties, the Clinical Nutrition Research Units, and projects directed to specific issues such as the work of our task force reviewing the National Academy of Sciences report entitled "Diet, Nutrition, and Cancer."

The Department has recognized nutrition as an essential component of disease prevention and health promotion and has included it as one of the key initiatives to improve national health, to improve the quality of life, and to lower health care costs.

Although those objectives are currently being reviewed and finetuned, I would like at this time, Mr. Chairman, to submit a copy of these 15 measurable objectives on nutrition into the hearing record. I have a copy of it here, Mr. Chairman.

Mr. WALGREN. Without objection.

[The document mentioned above follows:]

MAR 1983

IMPROVED NUTRITION

1. Summary of the Problem

Appropriate nutrition is necessary for optimal growth and development, physical activity, reproduction, lactation, recovery from illness and injury and maintenance of health throughout the life cycle. A variety of health problems can occur when persons have deficits of essential nutrients or have excessive or inappropriate consumption of some nutrients. While the role of nutrition in health problems is not fully understood, epidemiologic and laboratory studies offer important insights which may help people in making food choices to enhance their prospects of attaining or maintaining health.

Current data indicate an inappropriate nutritional status for a substantial proportion of the American public. For example, for people aged 20 to 74 about 14 percent of men and 24 percent of women are classified as obese. The rates are significantly higher for women regardless of their economic status. Iron and folic acid deficiencies are common among pregnant or lactating women. It has been estimated that between 10 to 15 percent of infants and children among migratory workers and certain rural poor populations suffer growth retardation due to dietary inadequacies. And the average daily sodium ingestion is substantially higher for the U.S. population generally than the recommended intake levels.

But some progress has been made over the last decade. Studies indicate that people have begun to consume less total fat, saturated fat and cholesterol. Prevalence of breast feeding has increased to a point where it is the mode of feeding for 45 percent of newborns in the country. And, a number of recent surveys indicate that more people are interested in nutrition, are more aware of the actions they can take to maintain health through their daily eating patterns, and have initiated changes in their nutritional practices.

2. Priority Objectives

To provide a measure of progress, national objectives have been established as quantifiable goals designed to improve health, reduce risk factors, increase awareness and improve protection and surveillance. Of the 17 nutrition-related goals listed in Objectives for the Nation, the 15 initially identified as priorities for the Federal effort are listed below.

- Improved health status
  - By 1990, the proportion of pregnant women with iron deficiency anemia (as estimated by hemoglobin concentrations early in pregnancy) should be reduced to 3.5 percent. (In 1978, the proportion was 7.7 percent.)
  - By 1990, growth retardation of infants and children caused by inadequate diets should have been eliminated in the United States as a public health problem. (In 1972-73, it was estimated that 10 to 15 percent of infants and children among migratory workers and certain poor rural populations suffered growth retardation due to dietary inadequacies.)

- Reduced risk factors

  - By 1990, the prevalence of significant overweight (120 percent of "desired" weight) among the U.S. adult population should be decreased to 10 percent of men and 17 percent of women, without nutritional impairment. (In 1971-74, 14 percent of adult men and 24 percent of women were more than 120 percent of "desired" weight.)

  - By 1990, 50 percent of the overweight population should have adopted weight loss regimens, combining an appropriate balance of diet and physical activity. (Baseline data unavailable.)

  - By 1990, the proportion of adults aged 18 to 74 with mean serum cholesterols above 230 mg/dl should be reduced by at least 50 percent. (In 1971-74, for male and female adults aged 18 to 74, the mean serum cholesterol level was 223 mg/dl and about 35 percent of adults had levels greater than 230 mg/dl.)

  - *By 1990, the average daily sodium ingestion (as measured by excretion) by adults should be reduced at least to the 3 to 6 gram range. (In 1979, estimates ranged between averages of 4 and 10 grams sodium. NOTE: One gram salt provides approximately .4 grams sodium.)

  - By 1990, the proportion of women who breastfeed their babies at hospital discharge should be increased to 75 percent and 35 percent at six months of age. (In 1978, the proportion was 45 percent at hospital discharge and 21 percent at 6 months of age.)

- Increased public/professional awareness

  - By 1990, the proportion of the population which is able to correctly associate the principal dietary factors known or strongly suspected to be related to disease, should exceed 75 percent for each of the following diseases: heart disease, high blood pressure, dental caries and cancer. (Baseline data largely unavailable. About 12 percent of adults are aware of the relationship between high blood pressure and sodium intake.)

  - By 1990, 70 percent of adults should be able to identify the major foods which are: low in fat content, low in sodium content, high in calories, high in sugars, good sources of fiber. (Baseline data unavailable.)

  - By 1990, 90 percent of adults should understand that to lose weight people must either consume foods that contain fewer calories or increase physical activity — or both. (Baseline data unavailable.)

---

*NOTE: Same objective as for High Blood Pressure Control.

- Improved services/protection --
  - By 1990, the labels of all packaged foods should contain useful calorie and nutrient information to enable consumers to select diets that promote and protect good health. Similar information should be displayed where nonpackaged foods are obtained or purchased.
  - By 1985, the proportion of employee and school cafeteria managers who are aware of, and actively promoting, USDA/DHHS dietary guidelines should be greater than 50 percent.
  - By 1990, all States should include nutrition education as part of required comprehensive school health education at elementary and secondary levels. (In 1979, only 10 States mandated nutrition as a core content area in school health education.)
  - By 1990, virtually all routine health contacts with health professionals should include some element of nutrition education and nutrition counseling. (Baseline data unavailable.)
- Improved surveillance/evaluation system
  - Before 1990, a comprehensive National nutrition status monitoring system should have the capability for detecting nutritional problems in special population groups, as well as for obtaining baseline data for decisions on National nutrition policies.

Those objectives represent a continuation of the Department's commitment to the development and dissemination of nutrition knowledge. They lend themselves to programs which can be implemented through State and local efforts; their achievement requires participation from the private sector; and, they relate to the needs of the hard-to-reach and individuals of greatest need.

3. Role of the Federal Government

A pluralistic process involving public and private participants from many sectors and backgrounds is necessary if the nutrition objectives are to be achieved by 1990. The role of the Federal Government in this process is to lead, catalyze and provide strategic support. In assuming this role the DHHS will:

- Develop and implement consumer education programs on a variety of nutrition-related topics;
- Support nutrition services through Federal and State health programs;
- Conduct further research to enhance information on the relationship between nutrition and health;
- Assure the provision of a safe food supply;

- Work with the publishing industry to enhance the amount and quality of textbook copy at all grade levels devoted to nutrition.
- Refine policies on food labeling;
- Support education of health professionals in nutrition;
- Monitor nutritional status; and,
- Work with the food industry to increase the number of food products with high nutritional quality.

The tables on the following pages identify, by objective, the activities supported by the Department of Health and Human Services that contribute to achievement of the nutrition priority objectives. Included within the tables are activities undertaken jointly by Federal agencies, State and local governments, and private sector organizations. Continuation activities and those planned for Fiscal Year 1982 and beyond are listed in the tables.

4. Coordination

Achievement of the objectives will require the development of activities which supplement and complement those of the Federal Government. Public health agencies and voluntary health organizations could offer nutrition education and weight reduction courses for the general public. Activities which affect high risk populations are especially important, e.g., local health departments could offer outreach nutrition programs for low income and minority women who do not have a history of using available services.

A range of possible activities contributing toward achievement of the nutrition objectives has been described in Healthy People: The Surgeon General's Report on Health Promotion and Disease Prevention and Promoting Health/Preventing Disease: Objectives for the Nation. The Department of Health and Human Services will support those activities that are consistent with the Federal role of leading, catalyzing and providing strategic support. State, local and private organizations will supplement this effort through activities that are compatible with their organizational mandate and available resources.

5. Summary of Federal Efforts

The DHHS efforts listed below are necessary for the achievement of the nutrition objectives by 1990. Most are already underway and it is anticipated that some will extend through 1990. Those yet to be initiated but anticipated for Fiscal Year 1982 and beyond are noted with an asterisk (*). The ability to engage in these efforts is contingent upon the availability of Federal fiscal and manpower resources. Those Federal efforts ascertained to produce the most progress toward achievement of the nutrition objectives will receive first priority in allocation of resources.

- o Education and Information Measures:
  - Development and updating of educational materials about nutrition to better inform the public and professionals of current advances in nutrition;
  - Distribution of the Dietary Guidelines to public and professional organizations;
  - Sponsorship of consumer education programs to educate consumers in the use of nutrition labeling;
  - Encouragement of expansion of the shelf labeling of foods in grocery stores to include caloric, fat, cholesterol, sodium and sugar content at point of purchase;
  - *Development of curricula for interdisciplinary training in applied nutrition for health profession schools; and,
  - Initiation of a public information campaign to encourage breast feeding.
  - *Encouragement of the publishing industry to introduce and increase the amount and quality to textbook copy at all grade levels devoted to nutrition.
- o Grants to States and Service Delivery Measures:
  - Encouragement for States to include health education/risk reduction programs that address nutritional and other risk factors in the Prevention Block Grant Program;
  - Support for nutrition services in State and local health agencies through block and categorical health grants.
  - Assessment of the need for supplemental food packages to low income women, children and infants at risk through the WIC program, and provide nutrition education services; and,
  - Inclusion of a full program of health and nutrition in the Head Start Program for children ages 3-6.
- o Technical Assistance/Cooperative Measures:
  - Cooperation with private sector organizations to initiate community nutrition education programs;
  - Encouragement of State and local education agencies to adopt those school health curricula which contain nutrition components;
  - Cooperation with food industry to expand nutrition labeling on the American food supply including the quantitative declaration of calories, fat, cholesterol, sodium, sugars and other nutrients;

  - Provision of technical assistance to the processed food industry to reduce sodium content in food;
  - Initiation of discussions with the Food Marketing Institute to affect in-store packaging and marketing strategies;
  - Assistance to State and local health agencies to improve their nutrition services.

- Economic and Other Incentive Measures:
  - Development of guidelines on the fortification of foods with acceptable iron compounds;
  - Review of regulations on dietary supplements for pregnant women and children and on infant formula to ensure nutritionally complete and safe products are sold;
  - Review of the nutrition labeling of food regulations which require the quantitative declaration of calories and nutrients; and,
  - Review of regulations on the sodium content of foods, including their classification as low or reduced in content.
- Research and Surveillance Measures:
  - Development of an integrated system for evaluating interrelated issues of food fortification;
  - Conduct of the Hispanic HANES surveys and complete the analysis of NHANES II;
  - Conduct of a nationwide food consumption survey with the U.S. Department of Agriculture;
  - Sponsorship of studies to monitor nutritional content of food supplies, to estimate changes in dietary consumption, and to assess dietary fat intake and cholesterol levels of the public;
  - Implementation of a model system integrating health status and dietary status data to enhance monitoring and to enable more accurate predictions of the populations' nutritional status; and
  - Conduct basic research on various nutrition-related diseases such as obesity, hypertension, etc.

Dr. **Brandt**. An implementation plan for achieving these measurable objectives will be released through a supplement to the September–October edition of our journal, "Public Health Reports."

I would like to emphasize that implementation of these objectives which must be considered national objectives, not just Federal objectives, must involve public and private participation from many sectors and backgrounds.

The establishment of seven Clinical Nutrition Research Units [CNRU's] by the NIH in fiscal years 1979–1980 was a creative and imaginative response to a longstanding need to bring clinical nutrition into the mainstream of medical research and practice. The CNRU's are already upgrading the role of clinical nutrition in the institutions where they are situated.

As you know, the National Research Council, commissioned by the National Cancer Institute, has conducted a comprehensive study of the scientific information pertaining to the relationship of diet and nutrition to cancer and that culminated in the publication of interim dietary guidelines in June 1982. With the release of these guidelines an interesting convergence has occurred in scientific recommendations related to the dietary factors that may affect cancer and cardiovascular disease.

The emerging scientific consensus conveys considerable implication for our nutrition activities, and a special interagency ad hoc task force has been established to review this report and consider further nutrition initiatives in relation to it.

I have set up other ad hoc task forces on subjects of specific departmental interest; all of these report to me. At the present time there are a number of task forces relevant to nutrition research that are completing their reports. These include the Interagency Task Force on the Implications of the Infant Formula Code for the United States, which is chaired by Surgeon General Koop; Task Force on the Assessment of Scientific Evidence Relating to Problems of Infant Feeding, chaired by Dr. Foege of the CDC; a Task Force on the Nutrition Objectives, chaired by the Director of the Bureau of Foods, Dr. Miller; and the task force that I just talked about concentrating on research, education, and monitoring recommendations of our response to the NAS report. It is chaired by the Deputy Assistant Secretary for Health, Dr. Michael McGinnis.

At the Alcohol, Drug Abuse, and Mental Health Administration [ADAMHA] and NIH areas of research that require emphasis are identified in several ways, including by knowledgeable program staff, by National Advisory Councils comprised of scientific and lay members, by special advisory committees, and finally, by study sections which can review the state-of-the-art of the field.

To summarize, utilizing these mechanisms and other strategies, we are in the process of refining a structure for defining an agenda in human nutrition research.

A progress report for the Human Nutrition Research and Information Management System has been approved by all the participating agencies. We are now ready to proceed with the implementation of it. I am grateful to all the other agencies for their confidence and support of the joint HHS-USDA Task Force that completed the negotiations on this system. The schedule calls for the data base to be functional by October 1, 1983, and the complete system operational in February 1984. We plan to use this system as an important step in developing a Federal human nutrition research plan.

This brings me, Mr. Chairman, to the implementation of the National Nutrition Monitoring System.

The Department of Health and Human Services is moving toward the development of a comprehensive nutrition monitoring system that will provide information needed for health decisions at the national, State, and local levels. While continuing activities initiated prior to June 1982, the Department has initiated a number of efforts identified in the implementation plan to improve interagency coordination, to monitor the nutritional status of special groups, to provide more timely and complete analysis of data, and to examine the relationship of food consumption patterns and nutrient content of foods to disease prevention and quality of the food supply. Let me address each of these issues separately.

Three major activities aimed at improving coordination have progressed considerably since June 1982.

The Nationwide Food Consumption Survey [NFCS] and the National Health and Nutrition Examination Survey [NHANES] Coordination Committee was charged with coordinating the content of these national surveys and designing future surveys with compatible sampling procedures and definitions. This Committee is working, and its work will continue over the next 2 to 3 years as part the planning for the 1987 surveys.

The NFCS/NHANES Data Users' Conference of dietary data users for the health community, academia, and various levels of government will be held in October of this year. Last September, the USDA awarded a grant to the National Academy of Sciences to study the use of the Food Consumption Survey data. At our request, the scope of the grant was revised so that the dietary component of NHANES would receive equal and simultaneous attention of data users. Specific recommendations to increase the survey effectiveness are expected to be formulated at the conference in October and reported by the National Academy of Sciences next March.

The Joint Nutrition Monitoring Evaluation Committee's charter has recently been approved. This committee was established to evaluate the findings of the Food Consumption Survey need, added and other Federal nutrition monitoring efforts and to report to Congress on the nutritional status of the population. The first meeting of the committee will occur as soon as possible after selection of the membership is accomplished. We expect to meet our target for the report to Congress in 1984. The examples of issues under analysis by this committee will include incidence of low birth weight and topics related to breast feeding practices.

The NHANES data are being analyzed to develop reports on obesity, anemia, hypertension, folacin and zinc nutrition and other aspects of nutritional status. The State-based CDC Nutrition Status Surveillance System information is analyzed in a continuing fashion with regard to special population groups. These activities and those being conducted by the USDA with respect to food consumption will provide a basis for a major part of the report to Congress.

Efforts are under way to improve our understanding of the nutritional status of certain special populations. We began the Hispanic HANES Survey [HHANES] in July 1982 and will complete it in December 1984. Analyses of NHANES II data is being done to examine nutritional status of income groupings, age, sex, and other important variables. Nutrition monitoring activities of special populations also continue out of the Nutrition Division of the CDC. CDC publishes an annual Nutrition Surveillance Report that summarizes nutritional data from such programs as Maternal and Child Health [MCH], the Women, Infants, and Children program [WIC], the Early Periodic Screening Detection and Treatment program [EPSDT], and Headstart program.

As to turnaround time for data analysis, the lag time between data collection, release, analysis, and publication of NHANES data is becoming shorter, but we recognize that there is a need for continued improvement. Since last year, however, the NCHS has published four NHANES I reports related to nutrition and those topics are listed in my testimony. Several reports based on NHANES II data have been published.

Major collaborative efforts between FDA and NCHS are examining aspects of folacin, iron, and zinc nutrition of the population. The FDA is a major user of these data and depends greatly on other Government agencies for much of this information.

A key vehicle for accomplishing the encouragement of other agencies to engage in research is the Bureau of Foods Research Plan, published in March 1980, a document which remains viable today.

The FDA will continue the annual Total Diet Study involving essential mineral analysis of individual foods representative of the national food supply; the biennial Food Labeling and Packaging Survey, which permits analysis of changing nutrient composition and labeling of foods; the Annual Consumer Survey, focusing on consumer perceptions and understandings of key diet-related issues such as sodium as related to high blood pressure; and special consumer studies on major areas of possible public health concern such as excessive consumption of dietary supplements.

Studies supported by the NIH on the assessment of nutritional status, and the results obtained from epidemiologic studies, clinical investigations, and clinical trials provide the underpinnings for the surveys and the interpretation of the survey data.

I am asking the staff of the National Center for Health Statistics, the Food and Drug Administration, the Centers for Disease Control, and the National Institutes of Health, and others to consider long-term research activities to enhance the National Nutrition Monitoring System's data collection and analysis program within the Public Health Service. And I have listed three examples of research areas that will be considered as important to these activities.

In conclusion, I would like to assure you that we are expanding our coordinating role and activities with the Department of Agriculture. Assistant Secretary for Food and Consumer Services, Ms. Mary Jarratt, and I are meeting on a regular basis. We are making positive strides toward working together to coordinate our two surveys as well as to put the human nutrition research and information management system in place.

In recent weeks, Dr. Orville Bentley, the Assistant Secretary for Science and Education, and I have developed and will soon sign into formation an Interagency Committee on Human Nutrition Research designed to increase the overall effectiveness and productivity of the Federal research efforts in nutrition.

Mr. Chairman, that concludes my statement. My colleagues and I will be happy to respond to your questions.

[The prepared statement of Dr. Brandt follows:]

PREPARED STATEMENT BY EDWARD N. BRANDT, JR., M.D., PH. D., ASSISTANT SECRETARY FOR HEALTH, DEPARTMENT OF HEALTH AND HUMAN SERVICES

MR. CHAIRMAN AND MEMBERS OF THE SUBCOMMITTEE

I appreciate this opportunity to review with you the present and future directions for human nutrition research of the Department of Health and Human Services, and also to review with you our national efforts to monitor nutritional status. With me today are several officials closely associated with departmental activities in nutrition research, nutritional assessment and monitoring, and regulation of the food supply: Dr. James B. Wyngaarden, Director of the National Institutes of Health; Dr. Manning Feinleib, Director of the National Center for Health Statistics; and Dr. Sanford Miller, Director of the Bureau of Foods, Food and Drug Administration.

As you know, the Department of Health and Human Services has a vast array of activities important to improving our understanding regarding nutrition, as well as for applying that knowledge to efforts designed to enhance the nutritional well-being of the American people. Last year's testimony discussed research activities extensively. This year my testimony will provide an overview of the planning and coordination of present and future directions in human nutrition research, including the development of research agendas, and emphasize the implementation of the Human Nutrition Research Information and Management System (HNRIM) and the National Nutrition Monitoring System (NNMS).

NUTRITION RESEARCH

In FY 1982, DHHS expended $155.0 million for nutrition research, 95 percent of this amount ($144.3 million) by the National Institutes of Health (NIH), but research activities were also supported by the Food and Drug Administration (FDA) ($5.4 million), Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA) ($5.0 million), and the Health Resources and Services Administration (HRSA) ($0.3 million). In addition to this amount, the Centers for Disease Control (CDC) expended $2.6 million and the National Center for Health Statistics (NCHS) estimated that it expended $2.8 million on nutrition related activities in FY 1982.

Our Department along with the USDA has adopted a useful framework for discussing human nutrition research activities which encompass studies in three major areas: biomedical and behavioral sciences, food sciences, and nutrition education. A word about each of these areas is in order.

- Biomedical and Behavioral Sciences--Studies in these aspects of human nutrition research include the consequences of food or nutrient intake and its utilization by the intact organism (animal model or human being), and the metabolic and behavioral mechanisms involved. Included are investigations of nutrient variables at the cellular and subcellular levels, dietary and nutritional studies expected to produce significant changes in the health status of humans, studies designed to explain the metabolic role or function of nutrients in humans and in relevant animal models, studies concerned with genetic-nutrient-environmental interactions in humans where a nutrient is an experimental variable, and studies of the interaction of diets and nutrients with man-made or naturally occurring toxic materials.

Over the past year NIH has supported research in areas such as:

- The effects of environmental and host factors that affect nutritional requirement, the role of nutrition on perinatal outcome and survival of low birth weight infants, and the nutritional requirements of adolescents;
- Dietary sodium and its role in the prevention and management of hypertension; and
- The role of natural inhibitors in the prevention of cancer.

Currently, FDA has nutrition research activities focusing on:

- The adverse effects from nutrient imbalances and from food substances which interfere with the metabolism of nutrients, as well as the study of possible toxicity problems arising from excess consumption of individual nutrients.
- The exploration of the role of nutrition and its interaction with dietary components on behavior and in immune function in experimental animal models, methods development to improve our understanding of the role of fibrous material in the diet, and to

measure individual nutrients in complex formulated foods such as infant formulas and various medical foods used for the dietary management of disease.

In addition, ADAMHA supports:

- Research to assess biological and behavioral factors related to such eating disorders as obesity, anorexia nervosa, and uncontrollable excessive eating otherwise known as bulimia;

- Research on the relationship of drug abuse and nutritional status, the relationship of nutrition to brain development and function, the effects of malnutrition on the development of cognitive processes, the effects of various nutrients (such as sucrose) on hyperactivity in children, as well as the problems of secondary malnutrition in alcoholics and the mechanism of the fetal alcohol syndrome.

- In FY 1981, ADAMHA joined with NIH in encouraging new investigators to develop their research interests and capabilities in various aspects of nutrition and behavior through the "NIH New Investigator Research Award."

- Food Sciences--Studies in the food sciences aspects of human nutrition research are primarily concerned with the nutritional quality, content, or composition of foods, or with the bioavailability of nutrients in foods. Food sciences research includes studies on the nutritional characteristics of human foods and diets as influenced by varietal and species differences, harvest and post harvest technology, food processing, transportation, and retail food practices. It also includes studies on methods to improve speed and accuracy in the analysis of nutritionally important food components. More specifically, FDA is undertaking the study of nutrient bioavailability as influenced by diet composition and as concerned with the specific sources of nutrients that may be used for fortification purposes.

- Nutrition Education--Research in nutrition education includes studies of dietary practices, food consumption patterns, and their determinants; and studies on methods for informing and educating the public about nutrition, health and dietary practices. A recent undertaking is nutrition education research in school health promotion for cardiovascular health of children and adolescents.

Present and Future Directions for Human Nutrition Research

The Department and USDA have adopted the seven critical goals identified in the 1980 report of the Joint Subcommittee on Human Nutrition Research:

1. There is need to determine the food and nutritional requirements for maintaining health throughout the life cycle and for preventing and treating diseases, particularly chronic degenerative diseases.

2. Improved methods are needed to assess dietary and nutritional status and monitor populations.

3. The interactions of nutrients with each other and with other ingested substances, including drugs and alcohol, require elucidation, and better methods are needed to determine nutrient toxicity.

4. More knowledge is needed of the safety, quality, and nutritional value of foods, diets, and the national food supply.

5. Research training and research manpower development in the biomedical and behavioral aspects of nutrition and in food sciences should be expanded.

6. Programs in nutrition education for professionals should be developed, and nutrition education research programs and public education and information programs on nutrition should be expanded.

7. Expand international collaborative research efforts with both developed and less developed countries.

These have been useful in the strengthening and coordination of the human nutrition research planning activities of the Department. Like USDA, we have developed structures and approaches within the Department to enhance nutrition coordination. This is reflected in the work of the DHHS

Nutrition Policy Board. Among the other mechanisms which have been useful in mapping the future direction and ongoing coordination of our human nutrition research program are the health promotion/disease prevention nutrition objectives for the 80's, the Clinical Nutrition Research Units, and projects directed to specific issues such as the work of the departmental task force reviewing the National Academy of Sciences report on Diet, Nutrition, and Cancer.

Health Promotion/Disease Prevention Nutrition Objectives

The Department has recognized nutrition as an essential component of disease prevention and health promotion, and has included it as one of the key initiatives to improve national health, to improve quality of life, and lower health care costs. Although the objectives are being fine-tuned, I would like to submit a copy of these fifteen measurable objectives on nutrition into the hearing record at this time. They call for increased public awareness of dietary factors related to disease, improved information provided through food labels, and improved nutritional surveillance through a comprehensive national nutrition status monitoring system. The broad goals leading to the nutrition objectives, as well as the goals for 14 other health topics were originally described in Healthy People, the first Surgeon General's report on health promotion and disease prevention in 1979, and the strategy for achieving these goals was presented in 1980 in Promoting Health/Preventing Disease: Objectives for the Nation. An implementation plan for achieving these measurable objectives will be released through a supplement to the September-October edition of Public Health Reports.

Implementation of these objectives will involve public and private participation from many sectors and backgrounds, with leadership provided by DHHS and other parts of government in catalyzing and providing strategic support. FDA has been assigned responsibility for review and coordination of implementation efforts toward our nutrition objectives.

Clinical Nutrition Research Units (CNRUs)

The establishment of seven Clinical Nutrition Research Units (CNRUs) by NIH in FY 1979 was a creative and imaginative response to a longstanding need to bring clinical nutrition into the mainstream of medical research and practice. Each CNRU has these components: research with human subjects and populations; laboratory investigations; research training; shared facilities and research services; educational programs for medical students, house staff, practicing physicians, and paramedical personnel; nutritional support services; and public information activities.

The CNRUs are already upgrading the role of clinical nutrition in the institutions where they are situated. Ongoing nutritional research has been strengthened by the support they provide. In addition to expanding research in nutrition, the CNRUs are heavily involved in curriculum development.

The CNRU grant program is unique in its emphasis on shared resources and services. This sharing of facilities, particularly core nutrition laboratories, has also helped increase the number of multidisciplinary research projects in clinical and related areas. Another benefit of the ed facilities approach has been the ability to attract additional

Response to Diet, Nutrition, and Cancer Report

The National Research Council (NRC), commissioned by the National Cancer Institute (NCI) of NIH, has conducted a comprehensive study of the scientific information pertaining to the relationship of diet and nutrition to cancer which culminated in the publication of interim dietary guidelines for the public in June 1982.

With the release of the interim guidelines of the NAS/NRC Committee on Diet, Nutrition, and Cancer, an interesting convergence has occurred in scientific recommendations related to the dietary factors that may affect cancer and cardiovascular disease. The emerging scientific consensus conveys considerable implication for Department nutrition activities, and a special interagency ad hoc task force has been established to review the Diet, Nutrition, and Cancer report and consider further Department nutrition initiatives in relation to it.

Other Mechanisms: Reports from ad hoc task forces as well as nutrition planning approaches in ADAMHA and NIH offer direction in human nutrition research. I have set up other ad hoc task forces on subjects of specific departmental interest, which report to me. At the present time there are a number of task forces relevant to nutrition research that are completing their reports. These are the:

- Interagency Task Force on the Implications of the Infant Formula Code for the U.S., chaired by the Surgeon General, Dr. C. Everett Koop.

- Task Force on the Assessment of Scientific Evidence Relating to Problems of Infant Feeding, chaired by the Director of CDC, Dr. William H. Foege.

- DHHS Task Force on the Nutrition Objectives, chaired by the Director of the Bureau of Foods, FDA, Dr. Sanford Miller.

- A DHHS-wide task force concentrating on the research, education, and monitoring recommendations of the departmental response to the Diet, Nutrition, and Cancer report, chaired by the Deputy Assistant Secretary for Health (Disease Prevention and Health Promotion), Dr. J. Michael McGinnis.

At ADAMHA and NIH areas of research that require emphasis are identified by knowledgeable program staff of the Institutes and Divisions, usually in consultation with scientists in the research community; National Advisory Councils, comprised of scientific and lay members, provide advice to the Institutes on research priorities; special advisory committees which many programs have established are another sources of expert advice. Study sections review the state-of-the-art of the field within their purview and make recommendations, also. An individual scientist who is an expert in nutrition may also be invited to work with an Institute and provide advice for program activity and priority setting.

To summarize, utilizing the above mechanisms and other strategies, we are in the process of refining a structure for defining a departmental agenda in human nutrition research.

Human Nutrition Research and Information Management (HNRIM) System

A progress report for the Human Nutrition Research and Information Management (HNRIM) system has been approved by all the participating agencies. We are now ready to proceed with the implementation of the HNRIM system. I am grateful to the other agencies for their confidence and support of the joint DHHS-USDA HNRIM Task Force that completed the negotiations on the system.

The Task Force has developed a detailed data base description, four on-line formats for data display, and three basic printed (off-line) reports; agreed on the mechanism for data transfer from USDA to the HNRIM data base, and on mechanisms to protect financial data; and is presently considering alternative methods for making the data available to the scientific community in the most convenient and economical manner. The Computer System Design Proposal developed for the Task Force by NIH has been accepted. The schedule calls for the data base to be functional by October 1, 1983, and the complete system operational in February 1984. We plan to use the HNRIM system as an important step in developing a Federal human nutrition research plan.

National Nutrition Monitoring System (NNMS)

This brings me, Mr. Chairman, to the implementation of the National Nutrition Monitoring System. The Department of Health and Human Services is moving toward the development of a comprehensive nutrition monitoring system that will provide information needed for health decisions at the

National, State, and local levels. Included in the NNMS are aspects of our human nutrition programs in research, services, education, and food safety.

While continuing activities initiated prior to June 1982, the Department has initiated a number of efforts identified in the NNMS Implementation Plan to improve interagency coordination, to monitor the nutritional status of special groups, to provide more timely and complete analysis of data, and to examine the relationship of food consumption patterns and nutrient content of foods to disease prevention and quality of the food supply. I will address each of these issues separately.

Three major activities aimed at improving coordination of NNMS programs have progressed considerably since June 1982.

- The Nationwide Food Consumption Survey (NFCS), National Health and Nutrition Examination Survey (NHANES) Coordination Committee was charged with coordinating the content of these national surveys and designing future surveys with compatible sampling procedures and definitions. As a first step, scientists from USDA and DHHS evaluated the possibility of drawing the two surveys closer together. Though combining the surveys was judged not feasible, the scientists concluded there were ways to better coordinate them. Recommendations for better coordination included using common definitions of socioeconomic variables, comparable dietary data bases, and comparable presentations of results when possible to enable easy comparisons of results. At a June workshop for data users the decision was made to coordinate the content of the dietary components to meet the broadest set of data users' needs and to eliminate unnecessary overlap. This Committee's work will continue over the next two to three years as part of the planning for the 1987 surveys.

- The NFCS/NHANES Data Users' Conference of dietary data users for the health community, academia, and various levels of government will be held in October. The purpose of the conference is to obtain information from the users of NHANES and NFCS survey data in order to make these surveys more useful and usable. Last September the USDA awarded a grant to the National Academy of Sciences (NAS) to study the uses of NFCS data. At our request, the scope of the grant was revised so that the dietary component of NHANES would receive equal and simultaneous attention of data users. The efforts now being taken by NAS promise to provide us with specific information for meeting user needs and eliminating unnecessary overlaps between the surveys.

  A workshop of representatives of user groups was conducted in June to assist NAS in setting the agenda of the users conference in the Fall. Specific recommendations to increase survey effectiveness are expected to be formulated at the conference in October and reported by NAS next March.

- The Joint Nutrition Monitoring Evaluation Committee's (JNMEC) charter has been approved recently. This Committee was established to evaluate the findings of NFCS, NHANES, and other Federal nutrition monitoring efforts and to report to Congress on the nutritional status of the U.S. population. The first meeting of the Committee will occur as soon as possible after selection of membership is accomplished. Qualifications considered in developing recommendations for committee membership included medical and nutritional knowledge in terms of public health, knowledge of food economics, and knowledge of national nutrition issues. The committee will aid us in developing a report on the nutritional status of the population, in identifying gaps in the National Nutrition Monitoring System, and in recommending to the Departments general ways to improve the system.

Despite some delay in obtaining approval for the JNMEC, we expect to meet our target for the report to Congress in 1984. Departmental programs are examining specific issues in nutrition and on an ongoing basis will provide the Committee with a basis for portions of their report. Examples of issues under analysis include incidence of low birthweight and topics related to breastfeeding practices. The NHANES data are being analyzed to develop reports on obesity, anemia, hypertension, folacin and zinc nutrition and other aspects of nutritional status. The State-based CDC Nutrition Status Surveillance System information is analyzed in a continuing fashion with regard to special population groups. These activities and those being conducted by the USDA with respect to food consumption will provide a basis for a major part of the report to Congress.

An interagency Memorandum of Agreement between DHHS and USDA is now in the process of completion to ensure proper coordination and progress on assigned activities.

Monitoring Special Populations: Efforts are also under way to improve our understanding of the nutritional status of certain special populations. The Department began the Hispanic HANES survey in July 1982 and will complete it in December 1984. The first part of the study will be completed by December 1983 and covers selected counties in five Southwestern States. To date, 6,000 persons in 10 sites located in Texas, California, Colorado, Arizona, and New Mexico have been interviewed and 78 percent of them have been examined. Since the data are being processed shortly after collection, we are confident that first reports on health and nutritional status from Hispanic HANES will be released by the end of 1984. The second part of the study, from January 1984 to December 1984, will cover Puerto Ricans in selected counties of New Jersey, New York, and Connecticut, and Cuban-Americans in Dade County, Florida.

Analyses of NHANES II data is being done to examine nutritional status of income groupings, age, sex, and other important variables. These analyses will make an important contribution to our understanding of the relative risk of nutritional problems experienced by special population subgroups.

Nutrition monitoring activities of special populations also continue out of the Nutrition Division of the Center for Health Promotion and

Education at CDC. Some of the highlights of this year's activities at CDC include:

- Thirty-two States are currently participating in the Pediatric Nutritional Surveillance System, an increase of five over the previous year; and

- Pregnancy nutrition surveillance is currently under way in 18 States, an increase of two over the previous year.

CDC publishes an annual Nutrition Surveillance Report that summarizes nutritional data from such programs as Maternal and Child Health, WIC (in collaboration with USDA), EPSDT, and Headstart. Monthly and quarterly tabulative reports are made available to participating States and clinics. The format for these surveillance reports has been revised to provide more in-depth information as well as epidemiologic assessment of significant trends in nutritional status indicators.

Special populations have also been the target of activities undertaken by the Health Resources and Services Administration (HRSA), primarily State maternal and child health programs, community health centers, migrant health clinics, and Indian Health Service programs.

- State and local health agencies are making effective use of our maternal and child health guidance materials: Nutritional Screening of Children: A Manual for Screening and Followup for training of health care providers in local health programs in both the English and the Spanish versions of Nutrition Check-up for Children for teaching parents.

- o The NCHS National Natality and National Fetal Mortality Surveys partially supported by maternal and child health program funds are currently providing useful data from national probability samples of pregnant and postpartum women. Information about a wide variety of factors, including nutrition, associated with pregnancy outcome and infant health is now available.

Turnaround Time and Analysis of Data: On the issue of turnaround time for data, the lag time between data collection, release, analysis, and publication of NHANES data is becoming shorter, but the need for continued improvement remains. Since last year:

- o NCHS has published four NHANES I reports related to nutrition. Topics covered were obesity and dietary intake related to dental health, anemia, and cardiovascular disease risk factors. Other reports published include information on eye conditions and analytic issues related to NHANES data analysis.

- o Several reports based on NHANES II have been published covering dietary intake with respect to nutrients and calories, biochemical data on nutrient concentrations, blood lead levels, blood pressure levels, and preliminary results of blood and urine pesticide residues.

- Major collaborative analysis efforts between FDA and NCHS are examining aspects of folacin, iron, and zinc nutrition of the population. The effort includes FDA scientists working with NCHS staff to analyze NHANES II data that may be related to food fortification issues. Other collaborative analytic efforts include NIH scientists and NCHS staff examining issues of cholesterol levels and the prevalence of diabetes and heart disease.

The FDA is a major user of these survey data and depends greatly on other Government agencies for much of this information. In instances where data are inadequate or non-existent, FDA has encouraged other agencies to engage in research which would contribute to the knowledge base. A key vehicle for accomplishing this is the Bureau of Foods Research Plan, published in March 1980, which remains viable today. Extensive cooperation exists between FDA and NCHS to accelerate data analysis and interpretation for such purposes as revision of food fortification policies. With NCI and FDA input, plans are under way to further modify this core element of the NNMS to incorporate data needs pertaining to diet, nutrition and cancer.

The FDA will continue the annual Total Diet Study involving essential mineral analysis of individual foods representative of the national food supply; the biennial Food Labeling and Packaging Survey which permits analysis of the changing nutrient composition and labeling of foods as actually purchased and consumed by the public; the Annual Consumer Survey, focusing on consumer perceptions and understanding of key diet-related issues such as sodium as related to high blood pressure; and special consumer studies on major areas of possible public health concern such as excessive consumption of dietary supplements. I would like to point out that FDA promptly shares the results of these efforts with other components of the Department and with USDA, and, in fact, undertakes some of them in direct collaboration with sister agencies.

Other Research Support for the National Nutrition Monitoring System: Studies supported by the NIH on the assessment of nutritional status, and the results obtained from epidemiologic studies, clinical investigations, and clinical trials provide the underpinnings for the surveys and the interpretation of the survey data.

I am asking staff of NCHS, FDA, CDC, NIH and others to consider long-term research activities to enhance the National Nutrition Monitoring System's (NNMS) data collection and analyses program within PHS. Some examples of research areas that will be considered as important to NNMS activities include:

- Many techniques used in medical centers to assess health and nutritional status are not feasible or practicable to apply in population studies. Adapting or developing clinical techniques for use in the NNMS is an especially difficult problem.

- The relationships of body composition, skinfold measurements, weight and height to health and longevity need to be better defined to aid in interpretation of population data.

- Dietary intake methodologies that are more easily relatable to health and nutritional status need to be developed.

Conclusion

In conclusion, Mr. Chairman, I would like to assure you that we are expanding our coordinating role and activities with the Department of Agriculture. Assistant Secretary for Food and Consumer Services, Ms. Mary Jarratt, and I are meeting on a regular basis. We are making positive strides working together to coordinate our two surveys as well as to put the human nutrition management and information system in place. Also, in recent weeks Dr. Orville G. Bentley, the Assistant Secretary for Science and Education, and I signed into formation an Interagency Committee on Human Nutrition Research designed to increase the overall effectiveness and productivity of the Federal research efforts in nutrition.

My colleagues and I will be happy to respond to questions.

EDWARD N. BRANDT JR.

Assistant Secretary for Health
Department of Health and Human Services

Edward N. Brandt Jr. was sworn in May 14, 1981, as assistant secretary for health, Department of Health and Human Services. Dr. Brandt was nominated by President Reagan Feb. 13, 1981, and confirmed by the Senate May 4, 1981.

Before joining HHS, Dr. Brandt, a physician, was associated with the University of Texas. Since 1977, he had been vice chancellor for health affairs for the university system, based in Austin. From 1970 to 1977, he was dean of the graduate school, dean of medicine and executive dean of the University of Texas Medical Branch in Galveston. He had also served since 1970 as professor in the university's departments of preventive medicine and family medicine. From 1962 to 1970 Dr. Brandt was at the University of Oklahoma Medical Center, first as director of the Medical Research Computer Center and later as associate dean and associate director of the medical center.

As assistant secretary for health, Dr. Brandt directs the activities of the Public Health Service, which includes the Alcohol, Drug Abuse and Mental Health Administration; the Centers for Disease Control; the Food and Drug Administration; the Health Resources and Services Administration; and the National Institutes of Health.

Dr. Brandt provides policy guidance for other HHS health programs including the Health Care Financing Administration, which administers Medicare and Medicaid. He also maintains relationships with other governmental and private agencies concerned with health. He advises and assists the Secretary on health policy and on all health-related activities of the department.

Dr. Brandt was born July 3, 1933, in Oklahoma City, Okla. He received his B.S. degree in mathematics from the University of Oklahoma in 1954 and an M.S. degree in mathematics from Oklahoma State University in 1955. He received his M.D. in 1960 from the University of Oklahoma Medical Center and a Ph.D. in biostatistics from the same university in 1963. Dr. Brandt served his internship at the Veterans Administration Hospital in Oklahoma City and was an internal medicine resident at the University of Oklahoma Medical Center.

Dr. Brandt is the U.S. member of the Executive Board of the World Health Organization and is the U.S. delegate to the Pan American Health Organization. He has been active in various committees of the American Medical Association, Texas Medical Association and the American Association of Medical Colleges. At the time of his confirmation as assistant secretary for health, he was serving as chairman of the AMA's section on medical schools. He is also a member of the American Academy of Family Physicians' Commission on Legislation and Governmental Affairs. He has served on many boards, committees and foundations and holds memberships in a number of honorary and professional societies.

Dr. Brandt has published extensively and has made significant contributions to the professional literature throughout the entire range of health and statistical issues.

Dr. Brandt and his wife, the former Patricia Lawson, have three sons: Patrick James, Edward N. III and Rex Carlin.

October 1982

Mr. **Brown** [presiding]. Thank you very much, Dr. Brandt.

Your statement is very comprehensive and for one who is not an expert in the area, it can be almost overwhelming in laying out the mass of activities which obviously are going on in your Department. I find it difficult to criticize so many worthwhile initiatives that you are undertaking.

We do have, however, the continuing problem that is reflected by our concern for coordination and our concern for some evaluation of the results of what is going on not only in your Department but also in the other related departments.

It is these areas that I think deserve our attention. We bring these up in all of our hearings and we receive assurances that you are aware of the problem and that you are moving forward with the necessary actions to improve the status in these areas, and then something happens and the system seems to get disrupted, and we start on a new track. It is hard to tell just actually what has happened.

I don't understand, for example, why the subcommittee was abolished. I have read your letters and the statement from Dr. Keyworth and they are logical and convincing, obviously. But I think there is something behind them which doesn't get expressed. I am not sure it would do any good to ask you what that something is. But I am going to make an effort anyway to understand why it is this mechanism which was originally thought to be a desirable one, which undertook a worthwhile task which had a logical charter, why it has not succeeded and why you are now hurriedly putting something together as a substitute for it.

Dr. **Brandt**. Our objective is right there in all the correspondence that you have seen. There is no hidden agenda that I am aware of, at least I don't have any hidden agenda in accomplishing this.

We have put something together. Our objective, that is, the objective of Dr. Bentley and myself, and we are the ones who——

Mr. **Brown**. You jointly suggested that the subcommittee be terminated?

Dr. **Brandt**. That's correct. The principal reason for that was that this was a joint subcommittee of two committees that are not in existence, which struck us as a little strange.

Second, is that the Department of Agriculture and the Department of Health and Human Services are the principal Federal agencies that are charged with human nutrition research and that are carrying out human nutrition research. It seemed reasonable that this be established rather than as a subcommittee reporting, as I say, to two committees that haven't met in a couple of years, that it be better responsible to the two Departments that are in existence.

We have made only those modifications to the charter that would indicate that the reporting responsibility is now to the two Departments rather than to OSTP. That charter is currently out to all of the agencies that were members of the joint subcommittee, asking for their comments on it, and asking them to move. So, in effect, all we were really doing was to try to change the auspices of this subcommittee with the hopes that the issues that would be addressed could be responded to more readily since they would be coming directly to us.

That is all there is to it that I am aware of.

Mr. **Brown**. As I said before, this is a logical argument but I do have a little bit of concern about the other half dozen agencies which collectively represent only about 5 percent of the resources in this area but which, nevertheless, it is an important 5 percent.

They were not consulted, as far as I am able to ascertain, on this action. They need to be involved, it seems to me, also. Maybe not as much and maybe there are other mechanisms by which they can be involved. But I think it is important, for example, that the Department of Defense or the Veterans' Administration, which conduct extensive nutrition programs, should be involved in some way in these activities. They could, at the minimum, provide a useful supplement to the major activities which you are carrying on.

Dr. **Brandt**. We fully agree with you. In fact, we are urging all of those agencies to participate as actively as they have in this entity. So that we have no disagreement with your premise. We will work hard to get them to participate as actively as possible.

I don't think this is any different from other kinds of activities going on in the Federal Government where one department or two departments jointly have the lead in activities. I fully anticipate that with the interest that those departments have—VA, DOD, others, that they will continue to participate. We certainly want them, and need them. Should a problem arise with that, we will deal with it.

Mr. **Brown**. The problem that I see arising for it is that there is no incentive for them to participate. All they get is interference from you if they participate.

Dr. **Brandt**. I don't know what you mean by interference from us because certainly we don't intend to interfere with them.

Mr. **Brown**. It is an additional restriction on their right to conduct an unrestrained program without paying any attention to anybody else.

Now, I presume that there are canons of professional conduct and a concern for the advancement of science and all sorts of good things like that which would lead them to want to have some communication, at least, but not to the extent of interfering with what they are doing.

Dr. **Brandt**. We have no intention of interfering in their activities because, quite frankly, the activities that those agencies carry out are important to the total effort in nutrition and in nutrition research.

We, indeed, will be encouraging them to do as much as possible and probably more. The incentive, I think, is that it is a place where not only can experiences and activities be shared, but we can work together to accomplish some various things.

Now, we work together, for example, in other areas with the VA, with DOD, with other agencies quite frequently. I see no difficulty with that kind of relationship continuing.

Mr. **Brown**. Dr. Brandt, you have made some reference to the evaluation committee in your statement.

Dr. **Brandt**. Yes, sir.

Mr. **Brown**. We have brought that up with you before and as I recall, last year you hadn't completed the formation of the committee. You gave us the names of individuals who had been asked to serve but you hadn't completed it and there was a lack of representation from the private sector, from State and local government.

What is the current situation with regard to a balance on the committee and is it functioning yet or are we still waiting to have it completed as we were last year?

Dr. **Brandt**. It has not met yet because all of the membership has not yet been appointed. As you know, there is a process in the executive branch with respect to the establishment of such groups. The charter for that was approved about 2 weeks ago, maybe 3 weeks ago. We are still completing the membership which has not been appointed. We anticipate that that will be done very shortly and that they will meet as quickly as possible after all of the nominees are named and have agreed to serve.

Mr. **Brown**. A cynical person, Dr. Brandt, would say that that sounds suspiciously like what you said a year ago, and would ask, why has not more happened in the last year other than a spasmodic effort 2 weeks before this hearing to indicate that there was some progress taking place.

Dr. **Brandt**. I would say, sir, that you wouldn't even have to be cynical to say that that sounded like what I said a year ago because, in fact, it is what I said a year ago. I can only say to you that I don't have an excuse for the fact that the progress was not as rapid as it clearly should have been.

Mr. **Brown**. Are you having some problems in the nature of establishing a political reliability in some of these appointments or something of that sort?

Dr. **Brandt**. Not to my knowledge. We have gone through the ordinary process for establishing this organization. And, as I say, that charter has just been cleared by whoever clears those charters, and is now cleared and the names are now being looked at. I hope that we can get them appointed, and that they will agree to serve.

Mr. **Brown**. The names have actually been submitted?

Dr. **Brandt**. Some names have been submitted; yes, sir. I am not sure that we have the complete balance, as you have indicated, that is desirable. We are examining that to make sure that it is.

Mr. **Brown**. I really shouldn't have to mention this but the appearance of lack of action and the possibility that it is due to efforts to find people who have proscribed political or ideological philosophies raises hackles down here on both sides of the aisle that sometimes varies depending upon which party is involved.

We raised this question a year or two ago with regard to scientific appointments, advisory appointments, and so on. While I don't like to create a furor over reasonable efforts to get people who are compatible, it is very easy to overdo this sometimes. I am not asserting that it is being done here. I am just advising caution if there is an effort of this sort being made.

I would like to call on Mr. Evans. Do you have any questions?

Mr. **Evans**. No; I have no questions.

Mr. **Brown**. Mr. MacKay?

Mr. **MacKay**. Mr. Chairman, I wasn't here last year and, therefore, I may ask some questions that seem too basic.

In your statement, Dr. Brandt, you indicated on page 2 the scope of your department's nutrition research and I tried to follow that through to see if I could understand the specifics that you actually spent money for. You said 95 percent of the amount, which was $144.3 million, was spent by the National Institutes of Health which basically means that is where most of your money went.

Then on the next page, you said NIH has supported research in areas such as—and you have mentioned three areas: Environmental and host factors that affect nutritional requirement, et cetera; dietary sodium; and the role of national inhibitors in the prevention of cancer.

Is it my assumption that that accounts for $144 million?

Dr. **BRANDT**. Absolutely not. These are only the areas that we thought the committee would find of special interest.

Dr. Wyngaarden is the Director of the NIH and can discuss that in some detail.

Mr. **MACKAY**. That's good. I would like to ask Dr. Wyngaarden, if I might, if you would give me—and I won't be embarrassed at how basic it is—I am under the impression from what I hear that NIH is in the high-tech business. And if there was a valid criticism, it is that NIH is in the business of artificial hearts and things that expand the life span but that NIH prioritywise is not really working too much in the areas that have to do with the quality of the years that we have now.

I may not even be stating that well, I am so basic. So I want to ask you: It seems to me that one way we could start dealing with our health cost problems in America would be doing research on trying to make people live a more healthy life, which I think has to do with exercise, nutrition, and a lot of things.

What I would like to find out is how much of this $144 million went into that, and what else you do, and what proportion of your total effort is that?

Dr. **WYNGAARDEN**. Yes, sir, Mr. MacKay, I will try to respond to that. I hope in the few moments that I address this question that I can also answer your concern about the distribution of our efforts because our efforts do span the entire spectrum of basic studies on up into clinical and community application and education.

Of the $144 million in nutrition research, roughly half is in research grants. We have 1,318 regular research grants and about 80 program project grants in addition that are conducted in the extramural community in universities and other institutions around the country.

We have about 150 contracts for specific nutritional inquiries. We also support seven clinical nutrition research units. But in addition, some 60 other centers organized for other topics, also conduct nutrition research.

Of the total $144 million, roughly two-thirds we classify as basic research. This has to deal with the fundamental mechanisms of vitamins and metabolic reactions, for example. And slightly more than one-third is in application—clinical research and clinical trials. We have slightly more than $10 million in clinical trials in which we are actually investigating nutritional problems and their effect on specific disease situations.

In Dr. Brandt's testimony he hit a few high points of our program but we have a booklet here which summarizes fiscal year 1981, which I would be happy to submit for the record, which summarizes all of our programs in biomedial and behavioral nutrition research and training.

Mr. BROWN. Without objection, we will receive that for the record.

[Document is on file with the Science, Research and Technology Subcommittee and is available from NIH; "Annual Report of the National Institutes of Health Program in Biomedical and Behavioral Nutrition Research and Training Fiscal Year 1981," NIH Publication No. 82-2092, June 1982.]

Dr. WYNGAARDEN. We have an update of this for fiscal 1982, too, which is currently in press which we will be glad to forward when it is available. The range of topics addressed by our research grant program and incentive program runs many, many pages.

Mr. MACKAY. I think I speak for a lot of people who are comfortably ignorant in this area and I think it is probably appropriate that I should be representing a number of ignorant people since I consider myself fairly ignorant, but I believe the public perception is very rapidly changing in terms of public priorities. And the public is very much interested in this relation of nutrition and lifestyle or preventive health care. I have the perception that the public may be way ahead of the Government.

The question I want to ask is not how many pages of that is directed to nutrition research but is that increasing, and what percent of that is the total? What is the percentage of that of your total activities, and how is that percentage changing?

In other words, what is your perception of the problem?

Dr. WYNGAARDEN. Yes. At present, 4.1 percent of our entire budget is in the field of nutrition.

Mr. MACKAY. 4.1?

Dr. WYNGAARDEN. 4.1 percent.

Mr. MACKAY. Is that higher now than it used to be, or lower?

Dr. WYNGAARDEN. It is increasing. The $144 million of 1982, we estimate will go to $155 million in 1983.

Mr. MACKAY. What percent will the $155 million be?

Dr. WYNGAARDEN. Well, that will increase just slightly because that increase is, in percentage terms, more than the increase of our total budget, so it might go up another tenth of a percent or so.

Mr. MACKAY. Now, who in your institution makes that decision about what percentage of your research efforts should go into nutrition, or does your institution function as a contractor for people like the Department of HHS? In other words, do you have a say in the policy or do you simply take their money and do what they say?

Dr. WYNGAARDEN. No; we have——

Mr. BROWN. Dr. Wyngaarden is glad that you asked that question, Mr. MacKay.

Mr. MACKAY. Well, my ignorance is so great that I don't know whether I am a good guy or a bad guy. But I have this feeling that 4.1 percent is a spectacularly inappropriate set of priorities.

Dr. **Wyngaarden**. We have considerable administrative freedom in directing resources toward important problems. There are several mechanisms that are in place at present.

First of all, the power of the scientific mechanism is that of the investigator-initiated research proposal. The best ideas come from the minds of the investigators who are working as new ideas present themselves. So we rely, in the first instance, on the proposals that are submitted to us. They are evaluated alongside of proposals in every other field.

The first question is the technical merit and scientific excellence of the proposal itself. There is a second round of peer review at the level of the councils of the funding institutes and they apply additional consideration such as program relevance and program balance.

We have also for several years had a Clinical Nutrition Coordinating Committee within the NIH and that Committee is made up of representatives of all the Institutes, and they do meet and review the programs.

In areas where it is felt wise to stimulate additional work they have done a number of things, such as convening conferences to bring related investigators together, they have issued reports, they have issued requests for proposals in specific areas, requests for applications in certain areas; they have convened ad hoc task forces to address specific problems. A good example of that recently has been in the nutritional approach to chronic renal failure—end stage renal disease. Such an ad hoc committee met just last month and as a result of that we are now preparing a request for cooperative agreement proposals that we hope will interest about 10 centers in a joint effort to address that problem.

The percentage of the budget in the nutrition field varies substantially from one institute to another, for example, the National Institute of Arthritis, Diabetes, Digestive, and Kidney Diseases has nearly 7½ percent of its budget in nutrition work.

The National Institute of Child Health and Human Development has over 8 percent in nutrition work. And the Division of Research Resources, which funds, among other things, our clinical research centers, some 60-plus of those around the country, has almost 9 percent of its resources in nutrition work.

So the Institutes that have a very special interest here are clearly funding a larger proportion of the work.

Mr. **Brown**. Would the gentleman yield to me?

Go ahead, Dr. Brandt.

Dr. **Brandt**. I just want to make one other point. I think that it is difficult, Mr. MacKay, to look only at dollars. Some forms of research are considerably more expensive than others. Let me give you a specific example: Cancer is still one of the leading killers. A study of radiation and drug treatment of a particularly common cause of cancer may cost a great deal more than studies, for example—as we are getting ready to carry out—on diet and prevention of cancer.

So I don't think that one can get a full picture of the priorities simply by looking at dollars unless one had some common base for doing it, which we, unfortunately, don't have.

Mr. BROWN. While you are discussing this point that MacKay has raised, I noted a recent article in Science magazine describing and agonizing the reappraisal that you are going through with regard to whether you keep your commitment to maintain the 5,000 grants, or whether you reduce that in order to maintain the programs in some other areas.

I gather that other actors such as OMB are having some influence in this and that you may be under great pressure to maintain the 5,000 grants which you will have to take out of the hide of some other programs. That raises some very serious questions about what is going to happen to the nutrition centers, which are already underfunded, and to some of the other programs that I am sure you are worried about.

I have no idea what the current status of that reappraisal is but I wonder if I could ask you to comment on that, and how you see this impacting the nutrition research situation?

Dr. BRANDT. Dr. Wyngaarden can get into specifics, but I would like to give the overall view of this for a moment.

We feel that the two really essential components of the National Institutes of Health and, indeed, the research activities of the Public Health Service generally, Mr. Brown, are the investigator-initiated research grants. Those are the ones that have paid off remarkably in the past; they allow us to utilize the greatest genius that is available in the United States. And, as you know, after a long, agonizing appraisal involving the Congress and every interested, and even a few uninterested, participants, the number of 5,000 came out as sort of a stabilization figure that would allow universities, research institutions, and others to do some long-range planning.

I think that the second basic component we see in the National Institutes of Health is the intramural program, which, again, has produced great advances in medicine and health, and we think we will continue to do so.

Hence, a reappraisal of the role of the investigator-initiated research grant versus other kinds of mechanisms is one that is not easily undertaken and one that, as you know, took nearly 10 years to arrive at the first time and I am sure that we will be undergoing this for some time. But Dr. Wyngaarden, I think, can talk to the specifics of it.

Dr. WYNGAARDEN. Yes; in the 1984 budget, in order to fund the 5,000 new and competing renewals, we have proposed a transfer of substantial moneys out of the center program, among others, as you indicated. And that does mean that those centers that come up for competitive renewal this year will be against much stiffer competition than they would otherwise be. Two of the seven nutrition centers are up for renewal this year.

Mr. BROWN. All right, I thought that was what was going to happen.

Mr. MacKay.

Mr. MACKAY. You are saying, then, because of budget constraints and a commitment to maintain a level of investigator-initiated research grants, you are actually going to strip money away from nutrition centers?

Dr. WYNGAARDEN. No; I didn't really say that.

Mr. **MacKay**. Well, I would like to know.

Dr. **Wyngaarden**. We are proposing the transfer of funds from several other categories into the research grant category. And one of those categories involves specialized centers and a very small fraction of those specialized centers are nutrition centers.

And of the seven CNRU's that we currently fund, two are up for competitive renewal this year. So they would be in this group that will be against very stiff competition.

Mr. **MacKay**. I am trying to get at the question of what is driving our setting of priorities in our policies in health research. I agree the biggest repository of innovation and genius is the investigator-initiated research.

However, I would think someone should be saying to the investigators, we think top priority should be in this area or this area. I think a part of the decision they make is whether we are going to investigate in areas of top priority.

I think somebody has said to them nutrition is incidental. Four-and-a-half percent—suppose I am off by a magnitude of 10—I agree the other research is more expensive. The other research is also driven by people who probably have something to do with where the investigators research, like drug companies and others, who have a different vision of how we can achieve better health in this country.

I am suggesting to you that somewhere in this system at the policy level, which I think we are, somebody has got to say that if you keep going this way, there is not enough money in the world to keep people healthy the way we are trying to do it.

I am asking: Is there somewhere in this labyrinth someone who makes that kind of decision? And if so, who did it, and got us at 4½ percent?

Dr. **Brandt**. I think that the process for setting research priorities in this country is, to say the least, a complex one. It involves, obviously, the Congress—the Congress funds various institutes at the NIH in differing amounts and, therefore, by those kinds of decisions sets priorities.

It comes from the executive branch because we make recommendations to the Congress about how we think those funds ought to be appropriated and into which Institutes and into which kinds of programs. And it comes from the scientific community.

We have, as a policy, set the constraint that we are going to fund only the best research. We would not put more money into nutrition research or any other kind of research that was of poor quality. And I am sure you wouldn't want that to happen. So that one of the things that has happened over the last few years has been that the nutrition research grants are coming in in larger numbers—better research, more research—that is aimed at the very thing that you are talking about. I think, Mr. MacKay, when you read the objectives that we have set for ourselves by 1990 in nutrition, they are aimed at precisely—we have precisely the same goals.

Our concern is to try to get people of this country to take the responsibility for their own health. And to do those things that will lead them to a better quality of life and, in fact, a better health status. That includes, among other things, nutrition, and exercise.

Mr. **MacKay**. But your priorities are about the same as the American people. You are saying, I want you all to reform, but I am going to put a little less into nutrition next year.

Dr. **Brandt**. No; I don't think that is correct. I think that we have said that it is not enough to continue to do research unless people begin to use the results of that research in their own lives.

Mr. **MacKay**. One of the things that research could show would be that the payoff is much more dramatic than we thus far know.

Dr. **Brandt**. I think we have shown that. I think the data is pretty clear about that. And I think that we have carried that out through all of the agencies of the Public Health Service, including the CDC, including the FDA, and so forth, to get across to the American people what these things indicate.

As I pointed out in my testimony, we are now beginning to see—one of the problems we have had in the past has been that has been a lot of debate and controversy over the interpretation and the meaning of much of the nutrition research as it applies to individuals.

We are now beginning to see some convergence on that. The National Academy's recent report on "Diet, Nutrition, and Cancer"—the guidelines that they have recommended are quite compatible with the guidelines that have come from numerous studies on the prevention of cardiovascular disease.

I have set out research right now to try to investigate the recommendations that came out of the National Academy's report.

So that we are following up on these kinds of activities. Our objective is to try to get as much information as we possibly can that will allow us to prevent disease before it occurs. I mean, that is the only way.

I fully agree with you that this country cannot build its system, cannot afford a system, that is dependent on care of the sick. It has to somehow or other reduce the number of sick people. And the way to do that is through all of these efforts.

Our research is aimed at that. I think the kind of information that is coming in is of value and will continue to be of value.

Dr. **Wyngaarden**. Mr. MacKay, if I can add a point or two. In the last 5½ years, the NIH has issued 72 different announcements designed to stimulate work in nutrition: program announcements, request for applications, and requests for proposals. These involved most of the Institutes at NIH. So that there is a concerted and continuous effort to stimulate work in areas in which special need is perceived to exist.

I would add also, that much of the nutrition work at the clinical level is very slow work. For example, the project that I mentioned in respect to end stage renal disease is estimated to be a 6-year project.

The project that the National Cancer Institute has started this year on the role of certain dietary factors and micronutrients on rates of developments of cancer may very well be an 8- or 10-year project. So that this is not a field in which there is quite as rapid a turnaround as perhaps a circumscribed laboratory-based investigation.

Dr. Brandt indicated that there was a range of costs in research and in general, nutrition projects tend to be a little less expensive.

So I would add another dimension to the answer to your question: There are 1,318 research grants and 83 program project grants in nutrition, which together are about 1,400, representing about 8 percent of all research awards in those categories.

Mr. **Brown**. Mr. Skeen.

Mr. **Skeen**. Thank you, Mr. Chairman.

I just want to have one quick question. It is kind of a followup with one that Mr. MacKay has asked. Has anyone got a handle from the DHHS or anyplace else on just how many governmental and nongovernment agencies are doing research on nutrition and related topics like that? Just how much money totally in the United States do we have dedicated to that?

Dr. **Brandt**. We have a very good handle on Federal efforts in this. We do not have, to my knowledge, anywhere, a good compilation of research that is being done by private industry, particularly food manufacturers, food processors, and other interested organizations who carry out significant amounts of research on nutrition. Although I am sure it is available, I just don't happen to have it.

Mr. **Skeen**. Is it significant or is it of such a nature that it is insignificant?

Dr. **Brandt**. No; I think it is significant. It is significant in a whole variety of ways, not the least of which is affecting behavior of people, that is, if you can make foods that are good for you taste good and attractive, all those kinds of things, people will eat them. I think that that kind of research is certainly important.

We also don't know how much is going on at the State levels because there are States, particularly agricultural States, that spend fair amounts of money in attempting to look at improved nutritional activities. I am sure that that information is available some place. I just don't happen to have it. We can try to find out those numbers for you and get them to you if you would like, sir.

Mr. **Skeen**. I don't want to feed just an ambient or a casual interest, but I would think that if we are going to discuss what the total impact on the nutritional well-being is of the United States that somewhere along the line we ought to get some idea of just how much total dedication. If dollars are the measure, how much totally? Is the Federal Government, State governments, and the private sector involved in nutritional research? It would be very interesting.

We are obviously a country that has done very well nutritionally, in spite of ourselves. I have always kidded someone about talking about the recession. The economists ought to go to a Wendy's or a McDonald index, or Captain Ahad's, or whoever you are eating with.

It would be interesting to know just how much total involvement we have in nutritional research, because I think it is probably considerable, and maybe the Federal involvement is just a small tip of the iceberg and one that somewhere along the line I would think it would be interesting to coordinate these. They were asking you questions about how you are coordinating your activities, that it has been difficult enough in just the various—how many grants? 1,300? 1,400?

Dr. **Brandt**. 1,400.

Mr. **Skeen**. 1,400 grants—keeping tabs on those plus those that are not associated with any Federal activity or State government activity.

I don't want to give somebody a research project that would be insignificant. But I would think that, possibly with my contribution to the overall idea of just where we are going with this kind of research.

Dr. **Brandt**. I think that you are right and that I wish that I had, frankly, gotten that information together before we got here, but I didn't.

I might say that we are only talking about HHS, too, because you have the Department of Agriculture testifying a little bit later who also gives research grants and also is involved and has nutrition centers. We know that the Veterans' Administration is heavily involved. But at the moment I don't have a handle, but we will certainly look into it and see how much information we can find, particularly about the private sector.

[The information follows:]

The Government's agenda in human nutrition research is indeed substantial. But it is not the only source of such research. Other sponsors of human nutrition research include private foundations, professional and voluntary organizations, food manufacturers and marketing institutions, the pharmaceutical and infant formula industry, commodity groups, the chemical nutrient manufacturing industry, and even, through analysis of actuarial tables, the insurance industry. A nice example of human nutrition-related research sponsored outside the government is the current large scale effort of the American Cancer Society to identify a variety of factors in cancer causation, including nutritional factors. Through our Interagency Committee on Human Nutrition Research the various Federal agencies involved in nutrition research are currently compiling inventories of current activities and plans for future activities. As we develop plans for our own efforts to meet perceived gaps we will consult with these other non-governmental partners in human nutrition research to insure that our efforts are closely coordinated.

Mr. **Skeen**. I would think it would give us a better scope and I appreciate the response. It was just a curiosity of mine in listening to the testimony that we heard here this morning and the questions. I don't think that we in Congress have a real handle on what we are talking about in the way of how much dedication we have either agencywise, private sectorwise, in all levels of government, plus the private sector.

It would be very interesting also to know just how much in the way of fiscal resource is going into this sort of research.

Dr. **Wyngaarden**. I was just handed a table of total Federal expenditures for research and training in 1982 among the various departments, and it comes to $195,300,000.[1]

Mr. **Skeen**. $195 million?

Dr. **Wyngaarden**. $195 million.

Mr. **Skeen**. That is Federal only?

Dr. **Wyngaarden**. Federal only; yes, sir.

Mr. **Skeen**. OK.

Thank you, Mr. Chairman.

Mr. **MacKay**. Mr. Chairman, I would like to make sure I understand this.

Mr. **Brown**. Mr. MacKay.

---

[1] DHHS requested data be changed to read: $206,981,000.

Mr. **MacKay**. On page 2 of your testimony, Dr. Brandt, you said that you spent $155 million.

Dr. **Brandt**. That's correct.

Mr. **MacKay**. Does that mean all the other agencies together, as far as you know, spend the other $40 million?

Dr. **Brandt**. Yes, sir.

Mr. **Brown**. Did you have another question, Mr. MacKay?

Mr. **MacKay**. I would like to just ask one other question.

There is a condition that is becoming a matter of intense interest in Florida as we find ourselves more and more with an older population and people in nursing homes. And people are now becoming aware of the fact that maybe 20 to 30 percent of the female population in nursing homes are suffering from a degenerative condition of the bones. I don't even know the technical term for it.

Dr. **Brandt**. Osteoporosis.

Mr. **MacKay**. Osteoporosis. And that many of those persons, if they did not have that condition, would not require being in nursing homes.

Now, what are you doing about that? And is that funding going up or is that some of the funding that is being stripped away to go somewhere else?

Dr. **Wyngaarden**. Osteoporosis is one of a range of metabolic bone diseases in which we have a very intense activity. It involves calcium and phosphoros metabolism and cartilage synthesis of the protein in which the calcium and phosphoros are laid down. And that spans the entire sweep of our studies throughout the human life span.

The National Institute of Child Health and Human Development, for example, has a great deal of work going on in that area. We know that there are important hormonal influences on the process of bone turnover, on the rate of deposition of calcium, on the rate of formation of the matrix, and on the rate of its turnover in the body. Estrogen plays an important role in that process.

That whole area is one of intense interest. It overlaps also the cancer field, because there are many cancers which accelerate the rate at which bone is resorbed, and lead to skeletal problems from that cause.

I can't give you offhand a precise estimate of our budget in that area, although we could certainly find that.

I would add that in April 1984, we have a consensus conference planned through our Office of Medical Applications in Research designed to address the problem of osteoporosis and specifically to bring together the experts in this field and to issue statements of advice regarding the best management of that condition.

So it is a high priority area with us we recognize.

Mr. **MacKay**. Will you tell me then, if it is high priority, if the investigators who are now funded in that field are being refunded or cut back?

Dr. **Wyngaarden**. I can't tell you that precisely. The average grant is made for 3 or 4 years, and at the end of that time the application comes in for competitive renewal. The refunding of a grant depends on the progress made during the initial phase of support and how experts in that field judge the merits of that work in comparison with other work being proposed.

A fairly high percentage of grants, once funded, have a fairly good chance of being continued if there is good progress. But there is always some turnover.

Mr. MACKAY. In your setting of priorities, then, the quandary that Mr. Brown talked about and you responded to concerning the effort to keep 5,000 investigator-initiated grants going, could that process result in the competition in these other areas becoming more keen?

Dr. WYNGAARDEN. It protects what we consider to be the most effective mechanism in the generation of new knowledge, that is, the investigator-initiated research project grant. With respect to osteoporosis, for example, many of those projects will come in, unsolicited, submitted by investigators whose field of interest is in this area. To the extent that we are protecting 5,000 new and competing awards we are protecting that kind of scientist. But as indicated earlier, some of the centers where work of this sort might also be going on will be facing stiffer competition as a result of that policy decision.

Mr. MACKAY. Is that policy decision, then, a result of a conclusion on your part that the centers are a less effective way of achieving medical knowledge than investigator initiated?

Dr. WYNGAARDEN. Only slightly less. We have to establish priorities to decide which we will protect in a constrained budget.

Mr. MACKAY. Do you need the Congress to say to you as a matter of policy, we want you to put a greater percentage of your effort into nutrition research?

I am not trying to ask editorially. I am just trying to find out how the system works. Are we entitled to look to you as the person who is setting the policy?

Dr. WYNGAARDEN. We do believe that the aspect of a freedom that is inherent in the American scientific system is best preserved by a minimum of direction from us, from the administration, and from the Congress in terms of micromanagement under the system because priorities will change, opportunities will change. If we get locked into directives, we find ourselves with less opportunity to respond to needs as they arise on the basis of scientific progress.

Mr. MACKAY. Then where would be the standard by which we would hold you accountable?

Dr. WYNGAARDEN. We are held accountable in terms of the output of American science and the influence that that has on the health of the American people. And there are many indices of that.

Mr. MACKAY. How would the American people say to you that we think 4½ percent, or if it is 8 percent, is not an appropriate set of priorities?

Dr. WYNGAARDEN. We have that kind of presentation at the budget hearings and with streams of people through my office. Everybody has a higher priority for his or her own disease area. There are literally thousands of named diseases. There are literally hundreds of societies that are interested in a particular disease.

I think that their interests are best served by providing the resources as the Congress and administration have done for several decades now, and then allowing the peer judgment of the scientists a great deal of latitude in deciding where the greatest opportunities really do rest.

Mr. MacKay. Excuse me, I don't mean to be argumentative, but that system, which has got to be the best possible system, I am not criticizing. But that system assumes you have unlimited dollars. If you don't have unlimited dollars, then you have got to say, or somebody has got to say, I think research in this area is more important to the society I serve than research in this area. It seems to me you have said that.

Dr. Wyngaarden. Yes. That also impinges on the decisions and it comes about in a number of ways. At present, 24 percent of the NIH budget is essentially mandated by congressional action, about 8 percent by legislative language, about 16 percent by report language. So a quarter of our budget is already fairly well mandated that way.

We are also organized, as you know, in categorical institutes. And the budget that Congress provides for one institute compared with another carry with it a message. We have, as I have indicated, a two-tier peer review system. The first examines proposals for scientific merit and technical feasibility. The second, the council mechanism, looks at broader issues and includes the kind of priorities that you have alluded to.

Some of the institute councils have gone farther in this direction than others and have actually set a percentage of their budgets in specific fields—not, perhaps, specific research projects, but specific fields—to address just the point that you are raising.

Mr. MacKay. Let me pose a kind of hypothetical case. Let me use my profession; I am a lawyer.

If there was a new branch of the law which had great promise and someone was disseminating research dollars and the peer review councils were made up of people in older branches of the law, that new branch would get about 4 percent.

I am trying to ask you who is making the policy decision in trying to drive the system in policy directions and not letting the peer review mechanism, in effect, capture the system and make it do what they know how to do?

I think you are the person who should be accountable for that kind of question. And if you are not, who is?

Dr. Wyngaarden. We are accountable for the decisions made. There is no denying that.

The peer review system does operate to establish priorities and the advisory systems impinge on that, and congressional directives impinge on that. And out of that come the decisions that are made; the budgetary allocations that are made. Four percent for nutritional work, it seems to me, is not a small percentage when you consider the range of problems that the NIH wants to address.

Dr. Brandt. One other thing that I am not going to argue is that our knowledge is complete, or that we are obviously doing as much as conceivably could be done. But I think the ultimate end point has to be the health of the American people.

We monitor that in a whole variety of ways, and every year all of those reports are much better. In 1982 our report on the health of the American people shows the best record in the history of this country. So something is happening that I think is important.

I also think it is important to go back to something that you said earlier; namely, that the American people are interested in nutrition. The best example of that, I think, is to go into the grocery store and go through and see how much of the advertising is now aimed at nutritional quality rather than just other kinds of things.

Our sodium initiative, for example, where companies went in and absolutely developed new foods that were low in sodium because the consumer was concerned about that, and because I think we had raised their level of awareness of this as a problem.

So I think, in fact, the nutrition efforts in this country are accelerating at a marked rate. We are clearly suffering somewhat from lack of knowledge of a number of years ago—osteoporosis being one example—where I suspect had we known as much as we do now the incidence or prevalence of that disease would not be nearly as great as it is at the moment.

I think we are making progress. I think the system of setting priorities, as I said, is a complex one. We would still feel that scientific feasibility is one of the most important—should be one of the most important components of that whole priority system. That is what must, it seems to me, ultimately be the real test.

Mr. **MacKay**. Mr. Chairman, you have these hearings, I presume, every year. I will be asking you about that 4 percent next year.

Dr. **Brandt**. Yes, sir.

Mr. **Brown**. Gentlemen, obviously the committee is interested in what you are doing. We would like to spend more time inquiring. I am not sure we are justified in view of the fact we have to hear from the Department of Agriculture yet, but I am willing to impose on you for just another couple of minutes.

Reading this Science article, I was intrigued by the frank discussion of the decisionmaking process that you go through and it is an excellent picture of you, Dr. Wyngaarden.

Dr. **Wyngaarden**. Thank you.

Mr. **Brown**. But it says here that you originally proposed reducing the number of grants to 3,676 in order to maintain the program in the research centers and that OMB said no. You, therefore, made the decision, based upon the scientific merit of all the applications for competitive grants, that they again ought to be 5,000 and you would take 140 million out of the research centers, including eliminating, I think it says here, 51 of the specialized research centers.

Now, I presume that is a fairly accurate description other than a little editorializing in my tone of voice of what happened there.

Dr. **Wyngaarden**. Yes; that's right. In the January submission of the budget we had included 1,300 fewer—3,674 is the precise figure for investigator-initiated research project grants, new and competing research project grants. Later we received a decision from OMB that we should fund 5,000 within the existing budget and, therefore, the budgetary shifts.

Mr. **Brown**. And it says here you are not permitted to lobby in favor of your original decision but that you can respond, if asked, and that your answer is that it would take another $305 million to bring the programs up to scratch. Is that roughly it?

Dr. **Wyngaarden**. Well, the specific question was how much money would it require to fund the programs of the January budget without any reductions, without any downward negotiation of the size of the grants, and so on. That figure was $305 million.

Mr. **Brown**. Including maintaining the nutrition research?

Dr. **Wyngaarden**. Including maintaining nutrition and other centers; yes.

Mr. **Brown**. All right. I don't want to belabor that.

I wanted to ask you another point or two; however——

Dr. **Brandt**. Mr. Brown, could I just make sure that the record is clear—that no decision has been made about those two nutrition research centers that come up for renewal this year. They will be under competitive renewal but nobody has—I just want to be sure that you understand that nobody has said those two are not going to be renewed yet.

Mr. **Brown**. Then we have a similar situation, do we not, in those centers funded by the Department of Agriculture?

Dr. **Brandt**. You will have to talk to them about that.

Mr. **Brown**. OK.

I am concerned about the Federal human nutrition research plan which was one of the things the joint subcommittee was going to be doing and which has been referred to by GAO studies, and others, as being an important ingredient in the overall research coordination.

Is one of you able to tell me what the prospects look like for developing a research plan? And I am not talking about the management information system.

Dr. **Brandt**. The research plan that we have submitted on an annual basis is what you are talking about? No?

Mr. **Brown**. No. We are referring to one that was recommended by GAO and at one point OSTP had indicated they were going to go ahead.

Dr. **Brandt**. Yes; we will, with the new mechanism that the two departments are setting up with Dr. Bentley and I, will in fact go ahead with that effort.

Mr. **Brown**. That will be high on the agenda——

Dr. **Brandt**. Yes, sir.

Mr. **Brown** [continuing]. New mechanism?

Dr. **Brandt**. Yes, sir.

Mr. **Brown**. You don't want to assert that you will have that ready for us in any preconceived timeframe, I presume?

Dr. **Brandt**. No, sir, I would prefer not to.

Mr. **Brown**. We can raise it again next year, can we?

Dr. **Brandt**. I really hope that you don't have that opportunity, Mr. Brown, in the sense that you will have it in front of you.

Mr. **MacKay**. Mr. Chairman, I would like in all seriousness to indicate that you can expect that to be in next year's agenda.

Dr. **Brandt**. Yes, sir.

Mr. **Brown**. I think that Dr. Brandt knows that we have a certain continuity in these things.

I must say that observing Dr. Brandt's performance over the past 3 years that it is getting better all the time.

Dr. **Brandt**. Thank you very much, sir.

Mr. **Brown**. All right, I am willing to defer any further questions.

I have had called to my attention an advertisement which I will show you. It says "Vegetables are good for you. Cabbage, brussel sprouts, carrots, cauliflower, spinach and broccoli versus cancer." But the product that is being sold, which I am sure is a very good product, is some kind of an incapsulated vegetable. They freeze-dry them or something like that. It claims, I guess, that this will cure cancer.

I am just wondering if the FDA or other agencies have any programs that would involve monitoring and restraining advertisements of this kind, which I am sure is for a perfectly healthy food but it can cause the wrong impression in the minds of some impressionable people.

Dr. MILLER. And some nonimpressionable people, too, it turns out.

We have already been undertaking action in this area and making inquiries and preparing our documents concerning that. We have written to the company indicating that their statements are not supportable as the first step in this action.

Certainly one of the most difficult areas of developing nutrition programs is keeping tabs on that because the claims and the hopes that these claims raise in people. Every time a report comes out like the NAS, all of the research that comes out of NIH, is unbelievable. And there are always people willing to take advantage of it. It is a very difficult problem.

Mr. BROWN. There is always an element of truth in here. I am sure that even dehydrated and pelletized vegetables are good for you if you don't overdo it but whether they can cure cancer or not is another problem.

Thank you very much, gentlemen. I am sorry we don't have more time to spend with you but we will make up for it next time.

We may want to submit questions in writing to you if we may.

[See followup questions and answers, appendix A, page 197.]

Mr. BROWN. Our next witness is Hon. Richard Lyng, Deputy Secretary of the Department of Agriculture, who will be accompanied by Mary Jarratt, Assistant Secretary for Food and Consumer Services, and Dr. Orville Bentley, Assistant Secretary for Science and Education.

All right. We are very pleased to have this distinguished delegation from the Department of Agriculture here and apologize for the delay that we had. We would invite you to proceed, Mr. Lyng, with your testimony and, of course, the full text of it will be included in the record at this point.

STATEMENT OF HON. RICHARD E. LYNG, DEPUTY SECRETARY, U.S. DEPARTMENT OF AGRICULTURE, ACCOMPANIED BY MARY C. JARRATT, ASSISTANT SECRETARY FOR FOOD AND CONSUMER SERVICES; ORVILLE G. BENTLEY, Ph. D., ASSISTANT SECRETARY FOR SCIENCE AND EDUCATION; ISABEL WOLF, ADMINISTRATOR, HUMAN NUTRITION INFORMATION SERVICE; AND DONALD THERRIAULT, Ph. D., ASSOCIATE DIRECTOR, ARS HUMAN NUTRITION RESEARCH CENTER

Mr. LYNG. Thank you, Mr. Chairman, and members of the subcommittees.

My colleagues and I are pleased to appear before you today to discuss the Department's activities regarding human nutrition research, education, and information.

I am accompanied by Dr. Orville Bentley, Assistant Secretary for Science and Education; Mary Jarratt, Assistant Secretary for Food and Consumer Services; Isabel Wolf, Administrator, Human Nutrition Information Service; and Dr. Donald Therriault, Associate Director of the Agriculture Research Service Human Nutrition Research Center at Beltsville.

Secretaries Bentley and Jarratt have prepared statements which will expand upon my remarks, and provide appropriate detail concerning activities in their respective areas.

A little over a year ago, we reported to the subcommittee that human nutrition research, education and information represent a commitment of the highest priority within the Department of Agriculture.

Our proposed funding of over $44 million for human nutrition research in the 1984 budget is evidence of our continued commitment in this area.

Since before the turn of the century, the Department of Agriculture has conducted a program of research in food and human nutrition and has made the results of this research available so that people could make informed food choices.

The results of the Department's research in human nutrition have benefited the nutritional health and well-being of millions in this country and throughout the world.

The Department's human nutrition research program concentrates on five areas specifically mandated by Congress in the Food and Agriculture Act of 1977.

These five areas are: Nutrition monitoring of the population; the nutrient composition of foods; factors affecting food practices and preferences; food program evaluation; and human nutrition requirements.

The first four of these are the responsibility of the Assistant Secretary for Food and Consumer Services. Determining nutrient requirements and methods for analyzing the nutrient content of food are the responsibility of the Assistant Secretary for Science and Education.

Miss Jarratt and Dr. Bentley will discuss these in greater detail.

Your committees have been major proponents of a coordinated national nutrition monitoring system. Since our report to you last year, we have made considerable progress in activities defined as the Department of Agriculture's responsibilities in the joint USDA-DHHS implementation plan.

We have taken important steps leading to initiation of a continuing survey of the food intakes of individuals to begin in fiscal year 1985.

We have obtained approval for the charter for the Joint Nutrition Monitoring Evaluation Committee.

We have held the first of two Data Users Conferences co-sponsored with the Department of Health and Human Services. And, we have made considerable progress in filling gaps in our knowledge of food composition.

I have been particularly pleased with how well the Department's reorganization of human nutrition research has worked. After the expected shakedown period, the Human Nutrition Information Service and the reorganized Science and Education Office are running smoothly. They are coordinating their efforts through the Secretary's Policy and Coordination Council.

At this point, with your permission, Mr. Chairman, and that of the committee, I would like to leave the balance of the USDA testimony to Secretary Jarratt and to Secretary Bentley to provide you with more detailed information on USDA's human nutrition programs and plans.

[The prepared statement of Mr. Lyng follows:]

STATEMENT OF
RICHARD E. LYNG, DEPUTY SECRETARY
U. S. DEPARTMENT OF AGRICULTURE
BEFORE THE
SUBCOMMITTEE ON SCIENCE, RESEARCH AND TECHNOLOGY
OF THE
COMMITTEE ON SCIENCE AND TECHNOLOGY
AND THE
SUBCOMMITTEE ON DEPARTMENT OPERATIONS, RESEARCH, AND FOREIGN AGRICULTURE
OF THE
COMMITTEE ON AGRICULTURE
U. S. HOUSE OF REPRESENTATIVES

JULY 14, 1983

Mr. Chairmen and Members of the Subcommittees:

My colleagues and I are pleased to appear before you today to discuss the Department's activities regarding human nutrition research, education and information. I am accompanied by Dr. Orville Bentley, Assistant Secretary for Science and Education; Miss Mary Jarratt, Assistant Secretary for Food and Consumer Services; Ms. Isabel Wolf, Administrator, Human Nutrition Information Service; and Dr. Donald Therriault, Associate Director of the ARS Human Nutrition Research Center, Beltsville, Maryland. Secretaries Bentley and Jarratt have prepared statements which will expand upon my remarks, and provide appropriate detail concerning activities in their respective areas.

A little over a year ago, we reported to the subcommittee that human nutrition research, education and information represent a commitment of the highest priority within the Department of Agriculture. Our proposed funding of over $44 million dollars for human nutrition research in the 1984 budget is evidence of our continued commitment in this area.

Since before the turn of the century, the Department of Agriculture has conducted a program of research in food and human nutrition and has made the results of this research available so that people could make informed food choices. The results of the Department's research in human nutrition have benefitted the nutritional health and well-being of millions in this country and throughout the world.

The Department's human nutrition research program concentrates on five areas specifically mandated by Congress in the Food and Agriculture Act of 1977. These five areas are: nutrition monitoring of the population, the nutrient composition of foods, factors affecting food practices and preferences, food program evaluation, and human nutrition requirements. The first four of these are the responsibility of the Assistant Secretary for Food and Consumer Services. Determining nutrient requirements and methods for analyzing the nutrient content of food are the responsibility of the Assistant Secretary for Science and Education. Miss Jarratt and Dr. Bentley are with me today to discuss in greater detail their ongoing research programs and their future plans.

Your Committees have been major proponents of a coordinated national nutrition monitoring system. Since our report to you last year, we have made considerable progress in activities defined as the Department of Agriculture's responsibilities in the joint USDA-DHHS implementation plan. We have taken important steps leading to initiation of a continuing survey of the food intakes

OF INDIVIDUALS TO BEGIN IN FY 1985. WE HAVE OBTAINED APPROVAL FOR THE CHARTER FOR THE JOINT NUTRITION MONITORING EVALUATION COMMITTEE. WE HAVE HELD THE FIRST OF TWO DATA USERS CONFERENCES CO-SPONSORED WITH THE DEPARTMENT OF HEALTH AND HUMAN SERVICES. AND, WE HAVE MADE CONSIDERABLE PROGRESS IN FILLING GAPS IN OUR KNOWLEDGE OF FOOD COMPOSITION.

I HAVE BEEN PARTICULARLY PLEASED WITH HOW WELL THE DEPARTMENT'S REORGANIZATION OF HUMAN NUTRITION RESEARCH HAS WORKED. AFTER THE EXPECTED SHAKE-DOWN PERIOD, THE HUMAN NUTRITION INFORMATION SERVICE AND THE REORGANIZED SCIENCE AND EDUCATION OFFICE ARE RUNNING SMOOTHLY. THEY ARE COORDINATING THEIR EFFORTS THROUGH THE SECRETARY'S POLICY AND COORDINATION COUNCIL.

AT THIS POINT, I WOULD LIKE TO ASK MISS JARRATT AND DR. BENTLEY TO PROVIDE YOU WTH MORE DETAILED INFORMATION ON THEIR HUMAN NUTRITION RESEARCH PROGRAMS AND PLANS.

Mr. WALGREN. Ms. Jarratt.

Ms. JARRATT. Thank you for the opportunity again to discuss the Food and Consumer Service's programs and plans for human nutrition research.

Basic and applied nutrition research provide knowledge essential to the Department's fundamental goal to insure that all Americans have an adequate and safe food supply. Our food assistance and education programs augment food production and marketing efforts to help achieve this goal.

I will discuss briefly some of HNIS's nutrition research initiatives in three areas: nutrition monitoring of the population; the nutrient composition of foods; and factors affecting food practices and preferences.

Research in these areas is specifically mandated in Agriculture legislation. We work closely with State universities and other Federal agencies, especially the Department of Health and Human Services, in several research areas. And internally our mechanism for coordinating nutrition research is the Secretary's Policy and Coordination Council.

Within Food and Consumer Services, the Human Nutrition Information Service has primary responsibility for the Department's part of the National Nutrition Monitoring System, for the National Nutrient Data Bank, and for studies of factors affecting food consumption and related practices.

Turning specifically to the monitoring system, your committees have been major proponents of a coordinated national nutrition monitoring system.

Since last year, we have made considerable progress, I think, in activities defined as Agriculture's responsibilities in the joint USDA-DHHS implementation plan.

Our primary responsibility is the monitoring of food and nutrient consumption of the U.S. population in terms of food supply, use in households, and foods eaten by individual household members.

Nationwide Food Consumption Surveys are the primary source of dietary information at both the household and individual levels.

We have taken important steps leading to initiation of continuing survey of food intakes of individuals in fiscal year 1985 as set forth in the plan.

Statisticians from the two Departments have completed their study as to how results from the NFCS and DHHS's National Health and Nutrition Examination Survey might be made more compatible.

In regard to household food consumption, we are looking further into the entire consumption process in the home, including food losses and discards. Results will permit a more complete interpretation of data from the next national household food consumption survey.

Approval for the charter for the Joint Nutrition Monitoring Evaluation Committee, as Mr. Lyng indicated, has been received from GSA.

One function of this committee is to report periodically to the Congress on the nutritional status of the population.

In September 1982, Agriculture made a grant to the Food and Nutrition Board of the National Academy of Sciences to carry out a study of uses of NFCS data and possible changes in future surveys which would lead to new or more effective uses of the information derived.

The Data Users Conference set forth by the two Departments implementation plan is an integral part of the Food and Nutrition Board study.

In March 1983, HHS joined Agriculture in sponsoring the Food and Nutrition Board/Academy of Sciences project. The project was expanded to cover uses of data from the dietary component of the NHANES Survey and the Department of Labor's Consumer Expenditure Survey, as well as Agriculture's Food Consumption Survey.

As part of the Food and Nutrition Board/NAS study of uses, a workshop on evaluation of Food Consumption Surveys was held in Washington this past June. About 50 data users were invited from the nutrition and health communities, academia, the food industry, and Government. Working groups dealt with a variety of interests in food consumption survey data. Included were assessments of food/nutrient intakes; food safety; intake trends, economics, marketing and product development; food and nutrition program analysis; and guidance.

The report from the workshop is not yet available but our departmental observers at the workship indicate that although there was a wide divergence in interests, they reached consensus on many issues. Included were continuation of both NFCS and NHANES as separate statistical series, but with a greater degree of data comparability than is now attainable.

Suggested sources of such comparability included sample design, food coding systems, and food composition data files, among others.

In another example, users noted that NHANES participants may be recontacted in connection with subsequent health-related studies, but such recontact of consumption survey respondents is not possible because identifications are destroyed.

Agriculture is now working with OMB in developing authorities and procedures whereby consumption survey respondents may be recontacted in urgent situations, and the privacy of individuals would yet be protected.

The Food and Nutrition Board/National Academy of Sciences plans another symposium on uses of food consumption survey data to be held in October. This one will be open to the public and a final report is due to the Department of Agriculture in March of next year.

The consensus among the data users that both consumption data and NHANES data should be continued as separate entities concurs with recommendations made by a team of survey statisticians from our two Departments in September 1982.

That team concluded that a merging of the two surveys would be impractical. Impediments to combination included excessive respondent burden, special NHANES data requirements affecting sample design, scheduling, and data collection. Possibilities for further coordination and comparability were noted, though, and action has been taken. The study was carried out in a response to a request from both Departments.

Our staff is studying a variety of technical issues which must be dealt with before starting the first continuing national survey of food intakes of individuals.

We need to test how people will respond to repeated requests for food intakes and to determine the number of days' intakes they are willing and able to report over a year's time.

Also, we want to know whether telephone interviews and mail-in food records might be substituted for the labor-intensive personal interviews we currently use now.

To answer such questions we initiated two separate methodology studies involving different population groups and alternative procedures for collecting food and beverage intakes for up to 12 days during a 1-year period.

In the first study, the exploratory study of longitudinal measures of individual food intakes, alternative methods for collecting data from the general population are tested.

Information is obtained from about 1,650 women who are between the ages of 20 and 64 residing in households of 2 or more persons located in middle-income neighborhoods.

The women are assigned to one of nine matched groups, each using a different data collection procedure involving varying combinations of personal and telephone interviews with the mail-in diary techniques.

Data collection in the second of four 3-month periods has been collected and completed. Preliminary results show marked differences in response rates. Rates with personal interview procedures are highest and those with mail-in records are lowest.

The second study, the pilot study of measures of individual food intakes of the low-income population, that was designed in response to the Agriculture Act of 1981. It instructed the Department, as you know, "to implement pilot programs to test various means of measuring on a continuing basis the nutritional status of low-income people."

In this two-phase study, information will be obtained from members in a total of 2,160 low-income households in nine pilot programs .

In phase I, data collection methods under study include personal and telephone interviews and mail-in diaries in combination with personal or telephone interviews.

For phase II, we will draw on the experiences gained in phase I, when pretests have been collected. The year-long data collection for phase I is scheduled to begin on or about September of 1983 in six localities.

Information from the Food and Nutrition Board/Academy of Sciences study of uses of food consumption data and preliminary results from the two methodological studies will be used in fiscal year 1984 to plan the continuing survey of food intakes of individuals scheduled to begin in fiscal year 1985. The initial contract for conducting the survey will be negotiated, we believe, in 1984.

Information on the nutrient content of foods and the effect on nutrient content of various handling and processing procedures is also an essential component of the nutrition monitoring system.

This information is required for national and international food and nutrition policy and planning. Our own agencies, other governmental groups, researchers, and public health professionals rely on this kind of material compiled by USDA.

Knowledge of food composition, although extensive, has not kept pace with the proliferation of foods available to the population. Also, several nutrients recognized as important are not covered for all foods in our existing food composition developed and compiled by USDA.

The knowledge of food composition, while extensive as we have indicated, has not kept pace with the proliferation of our food supply. Some available nutrients have not been studied to the extent that they should have to enable us to determine if we have them available in our food supply to meet the required amount for good health. Some of those that I am referring to are selenium or zinc.

We continue to conduct research to develop methods for food composition analysis that are more rapid, that distinguish among chemical forms of a nutrient with different degrees of biological activity, and incorporate extraction techniques for measurement of the contents of complex food mixtures.

At the same time, we continue to work cooperatively with the food industry and universities to generate more complete and reliable information on the nutrient composition of foods.

We are making considerable progress, I think, in filling gaps in our knowledge of food composition.

The National Nutrient Data Bank continues to expand at the rate of about 7,000 individual entries each month. Progress continues on our ability to disseminate information.

Newly updated information on the nutrient content of 170 breakfast cereals and almost 300 fruits and juices has been published.

Information on the nutrient content of 186 pork products and nearly 300 vegetable products will be off the press shortly.

Our food composition specialists cooperate with industry and university representatives each year in planning and arranging a national conference to promote accurate application of our data bases and to respond to the needs of the users. The eighth such conference will be held in about 2 weeks in Minneapolis.

Turning to factors affecting food practices and preferences, our nationwide surveys provide information on food-related behavior and socioeconomic factors that might be expected to affect the nutritional quality of diets.

To provide nutrition educators and program planners with needed information, studies have been made of some meal patterns, snacking, eating out, use of convenience foods, household food costs, size, and composition; stage in the life cycle; economic level and location of household, and participation in our food assistance programs.

We also believe that the discard of edible food in the home is of considerable economic as well as nutritional significance.

We have funded studies at the University of Arizona to test several methods of measuring household food discard and identify factors and attitudes associated with high food discard. Better understanding of the types of foods discarded and possible causes from these studies will help us design educational programs or other efforts to help reduce unnecessary food discard.

That concludes my portion of the presentation.

[The prepared statement of Ms. Jarratt follows:]

PREPARED STATEMENT OF MARY C. JARRATT, ASSISTANT SECRETARY FOR FOOD AND CONSUMER SERVICES, U.S. DEPARTMENT OF AGRICULTURE

Mr. Chairman and members of the Committee, thank you for this opportunity to discuss the Food and Consumer Service's program and plans for human nutrition research. Basic and applied nutrition research provide knowledge essential to the Department's fundamental goal -- to insure that all Americans have an adequate and safe food supply. Our food assistance and education programs augment food production and marketing efforts to help achieve this goal.

I will discuss briefly some of the Human Nutrition Information Service's nutrition research initiatives in three areas: Nutrition monitoring of the population, the nutrient composition of foods, and factors affecting food practices and preferences. Research in these areas is specifically mandated in the Food and Agriculture Act of 1977 and the Agriculture and Food Act of 1981. Within the Department, human nutrition research is coordinated through the Secretary's Policy and Coordination Council. We work closely with State Universities and other Federal agencies, especially the Department of Health and Human Services, in several research areas.

Within Food and Consumer Services, the Human Nutrition Information Service (HNIS) has primary responsibility for the Department's part of the National Nutrition Monitoring System, for the National Nutrient Data Bank, and for studies of factors affecting food consumption and related practices.

Nutrition Monitoring

Your Committees have been major proponents of a coordinated national nutrition monitoring system. Since last year, we have made considerable progress in activities defined as Agriculture's responsibilities in the joint USDA-DHHS implementation plan. Our primary responsibility is the monitoring of food and nutrient consumption of the U.S. population in terms of food supply, food use in households, and food eaten by individual household members. Nationwide Food Consumption Surveys (NFCS) are the primary source of dietary information at both the household and individual levels.

We have taken important steps leading to initiation of a continuing survey of food intakes of individuals in FY 1985 as set forth in the USDA-DHHS plan. Statisticians from the two Departments have completed their study as to how results from the NFCS and DHHS's National Health and Nutrition Examination Survey (NHANES) might be made more compatible. In regard to household food consumption, we are looking further into the entire consumption process in the home, including food losses and discards. Results will permit a more complete interpretation of data from the next national household food consumption survey, presently scheduled for FY 1987.

Approval for the charter for the Joint Nutrition Monitoring Evaluation Committee has just been received from GSA. One function of this Committee is to report periodically to the Congress on the nutritional status of the population.

In September 1982, Agriculture made a grant to the Food and Nutrition Board of the National Academy of Sciences (FNB/NAS) to carry out a study of uses of NFCS data and possible changes in future surveys which would lead to new or more effective use of the information derived. The NFCS Data Users Conference, set forth in the USDA-DHHS joint implementation plan, is an integral part of the FNB/NAS study.

In March 1983, DHHS joined Agriculture in sponsoring the FNB/NAS project. The project was expanded to cover uses of data from the dietary component of NHANES and the Department of Labor's Consumer Expenditure Survey, as well as Agriculture's NFCS.

As part of the FNB/NAS study of uses, a workshop on evaluation of Food Consumption Surveys was held in Washington, D.C. on June 6-8. About 50 data users were invited from the nutrition and health communities, academia, the food industry, and Government. Working groups dealt with a variety of interests in food consumption survey data. Included were assessments of food/nutrient intakes; food safety; intake trends; economics, marketing and product development; food and nutrition program analysis; and guidance.

The report from the workshop is not available yet. Agriculture's observers at the workshop, however, report that although experts had a wide divergence in interests, they reached consensus on many issues. Included were continuation of both NFCS and NHANES as separate statistical series, but with a greater degree of data comparability than is now attainable. Suggested sources of such comparability included sample design, food coding systems, and food composition data files among others.

In another example, users noted that NHANES participants may be recontacted in connection with subsequent health related studies, but such recontact of NFCS respondents is not possible because identifications are destroyed. Agriculture is now working with the Office of Management and Budget in developing authorities and procedures whereby NFCS recontacts would be possible in urgent situations, and the privacy of individuals would be protected. FNB/NAS plans another symposium on uses of food consumption survey data to be held in October. This symposium will be open to the public. A final report is due to Agriculture in March 1984.

The consensus among the data users that both NFCS and NHANES should be continued as separate entities concurs with recommendations made by a team of survey statisticians from the DHHS and Agriculture's Statistical Reporting Service in September 1982. The team concluded that a merging of NFCS and NHANES would be impractical. Impediments to combination included excessive respondent burden, and special NHANES data requirements affecting sample design, scheduling, and data collection. Possibilities for further coordination and comparability were noted and action has been taken. The study was carried out in response to a request from both Departments.

Our staff is studying a variety of technical issues which must be dealt with before starting the first continuing national survey of food intakes of individuals. We need to test how people will respond to repeated requests for food intakes and to determine the number of days' intakes they are willing and able to report over a year's time. Also, we want to know whether telephone interviews and mail-in food records might be substituted for the labor-intensive personal interviews now used in NFCS and NHANES. To answer such questions we initiated two separate methodology studies involving different population groups and alternative procedures for collecting food and beverage intakes for up to 12 days during a 1-year period (3 days per quarter).

In the first study, the Exploratory Study of Longitudinal Measures of Individual Food Intakes, alternative methods for collecting data from the general population are tested. Information is obtained from about 1650 women who are from 20 to 64 years of age, residing in households of 2 or more persons located in middle-income neighborhoods of four cities in the Middle Atlantic Region. The women are assigned to one of 9 matched groups, each using a different data collection procedure involving varying combinations of personal and telephone interviews and mail-in diary techniques.

Data collection in the second of four 3-month periods has been completed. Preliminary results show marked differences in response rates. Rates with personal interview procedures are highest and those with mail-in records are lowest. Response rates for telephone methods are lower than those for personal interviews, but higher than for mail-ins.

The second study, the Pilot Study of Measures of Individual Food Intakes of the Low-Income Population, was designed in response to Section 1329 of the Agriculture and Food Act of 1981. It instructed the Department "to implement pilot programs to test various means of measuring on a continuing basis the nutritional status of low-income people -- in order to develop minimum common criteria and methods for systematic nutrition monitoring that could be applied on a nationwide basis." In the two-phase study, information will be obtained from members in a total of 2,160 low-income households in 9 pilot programs (selected by region, urbanization, racial or ethnic group). In Phase I, data collection methods under study include personal and telephone interviews and mail-in diaries in combination with personal or telephone interviews. For Phase II, we will draw on the experience gained in Phase I. Pretests have been completed. The yearlong data collection for Phase I is scheduled to begin on or about September 1, 1983, in six localities throughout the United States.

Information from the FNB/NAS study of uses of food consumption data and preliminary results from the two methodological studies will be used in FY 1984 to plan the continuing survey of food intakes of individuals scheduled to begin in FY 1985. The initial contract for conducting the survey will be negotiated in FY 1984.

Nutrient Composition of Foods

Information on the nutrient content of foods and the effect on nutrient content of various handling and processing procedures is an essential component of the nutrition monitoring system. Such information is required also for national and international food and nutrition policy and planning. Our own agencies, other governmental groups, researchers, and public health professionals rely on food composition developed and complied by USDA.

Knowledge of food composition, although extensive, has not kept pace with the proliferation of foods available to the population. Also, several nutrients recognized as important are not covered for all foods in our existing food composition developed and compiled by USDA.

Knowledge of food composition, although extensive, has not kept pace with the proliferation of foods available to the population. Also, several nutrients recognized as important are not covered for all foods in our existing food composition tables. Some of these nutrients (zinc, folacin, selenium, and beta-carotene, for example) are of public health significance. Zinc and folacin are believed to be provided by the U.S. food supply in amounts insufficient for furnishing recommended levels to the entire population.

We continue to conduct research to develop methods for food composition analysis that are more rapid, distinguish among chemical forms of a nutrient with different degrees of biological activity, and incorporate extraction techniques for measurement of the contents of complex food mixtures. At the same time, we continue to work cooperatively with the food industry and universities to generate more complete and reliable information on the nutrient composition of foods. We are making considerable progress in filling gaps in our knowledge of food composition. The national Nutrient Data Bank continues to expand at the rate of 7,000 individual entries each month. Progress continues on our ability to disseminate information. Newly updated information on the nutrient content of 170 breakfast cereals and almost 300 fruits and juices has been published. Information on the nutrient content of 186 pork products and nearly 300 vegetable products will be off the press shortly.

Our food composition specialists cooperate with industry and university representatives each year in planning and arranging a national conference to promote accurate application of our data bases and to respond to the needs of data users. The eighth such conference will be attended by about 200 professionals in Minneapolis in two weeks.

Factors Affecting Food Practices and Preferences

Our nationwide surveys provide information on food-related behavior and socioeconomic factors that might be expected to affect the nutritional quality of diets. To provide nutrition educators and program planners with needed information, studies have been made of some of meal patterns; snacking; eating out; use of convenience foods; household food cost, size, and composition; stage in the life cycle; economic level and location of household; and participation in food assistance programs.

We believe that the discard of edible food in the home is of considerable economic as well as nutritional significance. We have funded studies at the University of Arizona to test several methods of measuring household food discard and identify factors and attitudes associated with high food discard. Better understanding of the types of foods discarded and possible causes from these studies will help us design educational programs or other efforts to reduce unnecessary food discard.

Mr. WALGREN. Thank you, Ms. Jarratt.

Let's turn to Dr. Bentley. And noticing that you have 12 pages plus an addendum, I would encourage you, if possible, to outline and summarize in any way you feel possible.

Dr. BENTLEY. Thank you, Mr. Chairman. I will try to do that.

I appreciate the opportunity to be here and talk about the subject of nutrition. I have the statement that has been submitted for the record and I will try to highlight some parts of it to bring out what we think are some of the important issues.

First, let me begin with the discussion of the reorganization and other factors that relate to the commitment of the USDA to human nutrition research activities.

The five human nutrition research centers were transferred to the ARS or Agricultural Research Service at the time of the reorganization, and the purpose being that they could better plan and coordinate their research in such a way that the agricultural research programs directed toward the nutritional needs of people.

The ARS strategic plan and the implementation plan that has been recently prepared—and here's a copy of it—emphasizes the commitment of the development of the ARS to human nutrition work.

We are in the process of developing an implementation plan for the strategy, and in doing so we will be working with other agencies within the Department, within universities, and certainly within ARS, to assure that the program will address many stages of life and conception to old age are given consideration.

It also should be pointed out that this year, with only moderate increases in ARS research program, the human nutrition research effort was increased from approximately $25 million to $31 million. This increase resulted from management efficiencies which enabled the redirection of funds within ARS to this high-priority effort. The increase was specifically earmarked to allow the USDA Human Nutrition Research Center on Aging at Tufts University to make better use of the $32 million facility that has just been completed.

A portion of these redirected funds were also used by the USDA Grand Forks Human Nutrition Research Center to support the programs in their newly expanded facilities.

There are some comments about the Consumer Nutrition Center and Secretary Jarratt has already discussed this, so I will move on to comments on the Beltsville Human Nutrition Research Center where we are developing sensitive and accurate methods for the determination of nutrient composition of foods.

Scientists in this center are in constant communication with individuals in the Consumer Nutrition Center advising them on the best methods available and sharing information of food composition. There is not as yet a formal mechanism for coordination of HNIS activities with ARS research; however, the informal mechanisms work very well, we believe.

Mr. Chairman, the so-called fragmentation of human nutrition has in no way hindered coordination between agencies within USDA.

In July of 1981, the Secretary established a Policy and Coordination Council for policy determination and issue resolution of all USDA crosscutting issues.

This Council is comprised of the Secretary, the Deputy Secretary, all Under and Assistant Secretaries, the General Counsel, and the Inspector General. The Council has two active task forces: one dealing with human nutrition information and the other with human nutrition research and education. Members of these task forces meet regularly to share information, determine needs, and coordinate approaches to the solution of problems. HNIS and ARS are both represented on each of these task forces.

The coordination of human nutrition research and education is not limited to agencies within USDA, as has been reported earlier.

As you well know, in 1978 the Office of Science and Technology Policy established the Joint Subcommittee on Human Nutrition Research to coordinate the nutrition research efforts of the eight Federal agencies with responsibility in this area. The subcommittee performed exceedingly well and accomplished a great deal since its initiation. It produced three major reports which lay the foundation for the development of the human nutrition research plan, and these are listed in the report.

These reports described in detail the research and education activities of each Federal agency and delineates areas in which cooperation exists. Further development of a Federal human nutrition research plan requires that high-level policy matters be addressed.

The present subcommittee has overcome the problem of information exchange, and this was no small matter. However, further progress requires participation by high-level policymakers. Therefore, the present subcommittee was terminated and HHS, with USDA, are initiating a new committee, the Interagency Committee on Human Nutrition Research, which will be cochaired by the Assistant Secretary of Science and Education of the USDA and the Assistant Secretary of HHS. Each of the eight Federal agencies on the Interagency Committee will be invited to participate.

Finally, in another matter having to do with operations, we are making progress in filling the position of Nutrition Coordinator and Assistant to the ARS Deputy Administrator. The position has been advertised nationwide and a search committee has been actively seeking applications. The search has narrowed to a very few candidates and a selection will be made shortly.

It has been said that the USDA has systematically transferred funds from applied to basic human nutrition research. The ARS strategy plans and implementation strategy indicates otherwise.

Our operational plans emphasize the need to establish the nutrient requirements of infants, children, and adolescents, to establish the relationship between nutrition and the aging process, to determine the bioavailability of nutrients in foods as consumed and develop reliable, efficient, and inexpensive methods for defining nutritional status and evaluating nutrition programs.

These are all highly important and relevant goals. We envision additional support for these programs in the years ahead.

The ARS program is concerned mainly with understanding the relationship between diet and health maintenance. The major components of this program are listed in my statement.

For those that might be following the text, I am now going to go to page 11 and make some comments after I have a drink of water.

Human nutrition research and information management system: The development and implementation of a human nutrition research and information management system is progressing. Since the submission of the plan to the Congress a year ago, a task force consisting of representatives from USDA and HHS, under the auspices of the Joint Subcommittee on Human Nutrition Research, has developed the technical specifications for the implementation of the system.

The task force has prepared a progress report which was submitted to the Secretaries of HHS and the USDA. The report indicates that a viable system which will meet the needs of all potential users can be in place by the end of the calendar year.

This will be an important tool for USDA continued planning and priority-setting for human nutrition research. Some specific areas of progress can be cited as a development of a classification system; identification of data elements; the number of formats for interactive retrieval of information; a mechanism for transmission of data to the central file, and collection, and timing for the collection of data.

Mr. Chairman, we are proud of the role we play in the Department in human nutrition research. We commend you and members of both subcommittees for your interest in this important subject.

I am attaching as a part of my testimony a document which was prepared by a special analysis team from ARS, the Extension Service and the Cooperative State Research Service. In this document, we attempt to take an in-depth look at the development of programs that are carried out through ARS, but those that are carried out in the agriculture experiment stations through the land-grant college system, insofar as the grants program is concerned, and programs that are conducted through the Extension Service and the cooperation of the Cooperative Extension Service, and this latter part being primarily with nutrition education.

This statement is a summary, I believe, of the high points in my statement. However, there is a great deal more information contained in the one that is submitted for the record.

Thank you.

[The prepared statement of Dr. Bentley follows:]

PREPARED STATEMENT OF ORVILLE G. BENTLEY, ASSISTANT SECRETARY, SCIENCE AND EDUCATION, U.S. DEPARTMENT OF AGRICULTURE

Mr. Chairman and Members of the Subcommittees, I appreciate the opportunity to appear before you today to discuss the human nutrition research programs.

Secretary Lyng has presented an excellent overview of these programs. I also want to emphasize the fact that this Administration is committed -- deeply committed -- to improving human nutrition research. I have prepared a rather detailed statement outlining our activities in human nutrition research and this statement is being submitted for the record. Because of time constraints, I will not attempt to deliver the entire text of this statement here today. However, I do want to address some specific points at this time.

The decision to restructure the human nutrition programs in the Department of Agriculture was made on the basis that these realignments would strengthen the programs and not, as some have said, because of a desire to reduce the commitment of the Department to research and education in human nutrition.

The recent reorganization within USDA took into consideration the essential human nutrition research activities in USDA's mission. Consequently, five human nutrition research centers were transferred to the Agricultural Research Service (ARS) where they can plan and coordinate their research in such a way that the agricultural research program is directed toward the nutritional needs of our people. The ARS Strategic Plan and Implementation strategy attests to the fact that increased attention will be given to human nutrition.

The operational plans which are presently being developed envision increased efforts in human nutrition research and close cooperation with other ARS programs to assure that nutrition requirements of our people at all stages of life, from conception to old age, are met.

It should also be pointed out that with only moderate increases for the ARS research program in fiscal year 1983, the human nutrition research effort was increased from approximately $25 million to $31 million. This increase resulted from management efficiencies which enabled the redirection of funds within ARS to this high priority effort. The increase was specifically earmarked to allow the USDA Human Nutrition Research Center on Aging at Tufts University to make full use of the $32 million facility which has just been completed. A portion of these redirected funds was also used by the USDA Grand Forks Human Nutrition Research Center to support the program in their newly expanded facilities.

On the other hand, the Consumer Nutrition Center, which was part of the Human Nutrition Center, under the former organizational structure was transferred to the Assistant Secretary for Food Consumer Services, where it could more closely relate to the Food and Nutrition Service (FNS) functions. Under the reorganization it became part of the Human Nutrition Information Service (HNIS). Its primary function remains to conduct the National Food Consumption surveys and to update and maintain the National Nutrient Data Bank. These functions are closely related to FNS' needs and are best conducted in close cooperation with that agency. This did not in any way affect the close relationship that exists between the Consumer Nutrition Center and the research activities conducted in ARS.

There is a major effort at the Beltsville Human Nutrition Research Center directed at developing sensitive and accurate methods for determination of nutrient composition of foods. Scientists in this center are in constant communication with individuals in the Consumer Nutrition Center advising them on the best methods available and sharing information of food composition. There is not as yet a formal mechanism for coordination of HNIS activities with ARS research activities, however, the informal mechanisms work very well.

Mr. Chairman, the so called fragmentation of Human Nutrition has in no way hindered coordination between agencies within USDA. In July 1981, the Secretary established a Policy and Coordination Council for policy determinations and issue resolution of all USDA crosscutting issues. This Council is comprised of the Secretary, the Deputy Secretary, all Under and Assistant Secretaries, the General Counsel and the Inspector General. Each chairs a committee for dealing with issues that fall primarily in his/her area and necessitates interagency coordination. There are two nutrition related committees. The Assistant Secretary for Food and Consumer Services, who is the key policy official for USDA's nutrition program, chairs the Food and Consumer Service Committee. The Assistant Secretary of Science and Education, who is the key policy official for nutrition research, chairs the Research and Education Committee. Each of these committees has an active task force, one dealing with Human Nutrition Information, the other with Human Nutrition Research and Education. Members of these task forces meet regularly to share information, determine needs and coordinate approaches to the solution of problems. HNIS and ARS are both represented on each of these task forces.

The coordination of Human Nutrition Research and Education is not limited to agencies within USDA. As you well know, in 1978 the Office of Science and Technology Policy (OSTP) established the Joint Subcommittee on Human Nutrition Research (JSHNR) to coordinate the nutrition research efforts of the eight Federal agencies with responsibility in human nutrition research. The subcommittee performed exceedingly well and accomplished a great deal since its initiation. It produced three major reports which lay the foundation for the development of a Federal Human Nutrition Research Plan. These reports were published under the title "Federally Supported Human Nutrition Research, Training and Education Update for the 1980's". The first report, Human Nutrition Research and Training, was published in December 1980. The second and third reports, International Human Nutrition Research, and Nutrition Education and Professional Personnel needs for Nutrition Education of Professionals and the Public, were published in June 1982.

These reports describe in detail the research and education activities of each participating Federal agency and delineates areas in which cooperation exists. Further development of a Federal Human Nutrition Research Plan requires that high level policy matters be addressed. The present subcommittee has overcome the problem of information exchange, and this was no small matter. However, further progress requires participation by high-level policymakers. Therefore, the present subcommittee was terminated and HHS with USDA are initiating a new committee, The Interagency Committee on Human Nutrition Research, which will be co-chaired by the Assistant Secretary of Science and Education, USDA and the Assistant Secretary of Health and Human Services. Each of the eight Federal agencies will have representation.

Finally, progress is being made in filling the position of Nutrition Coordinator and Assistant to the ARS Deputy Administrator. The position has been advertised nationwide and a Search Committee has been actively seeking applications. The search has narrowed to a very few candidates and a selection will be made very shortly.

It has been said that USDA has systematically transferred funds from applied to basic nutrition research. The ARS strategic plans and implementation strategy indicate otherwise. Our operational plans emphasize the need to establish the nutrient requirements of infants, children and adolescents, establish the relationship between nutrition and the aging process, determine the bioavailability of nutrients in foods as consumed and develop reliable, efficient and inexpensive methods for defining nutritional status and evaluating nutrition programs. These are all highly important and relevant goals. We envision additional support for these programs in the years ahead.

The ARS program is concerned mainly with understanding the relation between diet and health maintenance. The major components of the ARS research program include emphasis on:

- Infant and child populations to determine nutrient needs for optimal growth and development, and on pregnant and nursing women to determine nutrient needs and requirements for themselves and their children.
- Adult population to determine the biological functions of, requirements for, and interactions among essential nutrients and other dietary components.
- Aging populations to determine nutrient needs; influences of nutrient intake on changes in metabolism and functions of body systems of aged persons and on the process of aging per se.
- Methodology development to support dietary intake surveys, nutrition status monitoring programs, nutrition intervention and other action programs.

To carry out its objective, ARS maintains five research centers around the country. These research centers focus on major components of the overall program. Scientists at the Centers study a broad range of nutritional problems, and in the process develop innovative methodologies that benefit scientists in many other fields. They study nutrition questions using a variety of disciplines and scientific perspectives--from research to education, and from biochemistry to analyses of food plans. And, though they have individual areas of expertise, they work together to solve problems of common interest.

In addition, the ARS human nutrition program is carried out in a number of Regional Utilization laboratories where special technical expertise exists. These laboratories are located in Peoria, Ill.; Ithaca, N.Y.; Albany, Calif.; Wyndmoor, Pa.; and Athens, Ga. These laboratories concentrate their efforts on determining the nutrient composition of food and the forms in which nutrients appear in foods.

Beltsville Human Nutrition Research Center: Research on human nutrition has long been traditional in the USDA. Its history can be traced back without interruption to 1894, when Congress authorized the Office of Experiment Stations, with headquarters at Wesleyan University, Middletown, CT, to investigate human nutrition. In 1906, the headquarters of the Human Nutrition Investigations was moved to Washington, D.C. In 1941, the laboratories of the Food and Nutrition Division were moved to the Agricultural Research Center in Beltsville, MD.

> Operational Objective: Conduct basic and applied research to more completely define human requirements for essential nutrients, and identify through nutrient composition research foods that meet the nutritional requirments. This research includes the determination of requirements for known nutrients, the search for yet unidentified essential dietary factors, the definition of the biological availability of nutrients and the study of interactions among them.

Although scientists have studied the nutrient requirements of humans for many years, they still have much to learn about such issues as the metabolic effects of specific dietary constituents, such as sucrose and fiber; the optium intake of nutrients to maintain health and minimize risk of disease or toxicity; and interactions among nutrients and other dietary components. Through studies with both human subjects and animals, scientists at the Beltsville Center define requirements for protein, fats, carbohydrates, vitamins, and minerals, and identify the forms in which those nutrients are most useful in meeting human needs. As an integral part of the research program, they also develop new and highly sophisticated analytical instruments and techniques for sampling and analyzing foods and for determining the roles of and requirements for various nutrients.

Children's Nutrition Research Center (CNRC): The Children's Nutrition Research Center is operated through Cooperative Agreements between the ARS and Baylor College of Medicine. It functions within the Section of Nutrition and Gastroenterology of the Department of Pediatrics in accordance with a Memorandum of Understanding cosigned July 9, 1979, by Baylor College of Medicine, Texas Children's Hospital, the National Institute of Child Health and Human Development, and the U.S. Department of Agriculture.

> Operational Objective: Conduct research to determine the nutritional needs and evaluate the nutritional status of the pregnant and nursing woman, and of the child from conception through adolescence, with major emphasis on the development of new methods for investigating nutrient requirements in infants, and for studying the relationship between nutrition and growth and development

This broad mission which focuses on the nutrient needs of nearly half the population of the United States and has international implications is pursued by scientists who collaborate on multi-disciplinary investigations to provide answers to such questions as:

a. What effects does the diet (nutritional intake) of a pregnant woman have on the health of the child she delivers?

b. How does nutrition of the mother affect lactation and the nutrient content of her milk?

c. What is the relationship between nutrient intake and the physical and mental development of infants and children?

d. What are the nutritional needs for optimal growth and development in children from conception through adolescence?

Human Nutrition Research Center on Aging: The Human Nutrition Research Center on Aging is operated through a Cooperative Agreement cosigned by Tuft's University, the National Institute on Aging and the U.S. Department of Agriculture.

> Mission: Conduct research to determine the ways in which diet and nutritional status influence the onset of aging and the course of maturing in the United States.

The average lifespan in the U.S. today is 73 years, and should be well past 80 by the year 2000. Not only are we living longer, but more of us are living longer. In 1970 there were three million Americans over 65. Today there are 24 million, comprising 11 percent of our population. By the year 2030, it is estimated that 17 percent--or about 50 million people--of our population will be 65 or older. The ailments common to elderly populations today usually are associated with the gradual impairment of function of body systems or with the progression of chronic degenerative diseases. The costs of those ailments are enormous. The annual health care costs exceed $200 billion, and about 30 percent is for medical treatment of the chronic conditions that are common in the elderly. As a major contributor to health and fitness, nutrition is probably a factor in the onset and course of the degenerative processes associated with aging.

Using a wide variety of experimental animals, as well as human subjects, scientists study into the ways in which diet, alone and in association with other factors, can delay or prevent the onset of the degenerative conditions commonly associated with the aging process. Researchers also attempt to determine the nutrient requirements of the elderly and the ways in which an optimal diet, in combination with other factors - heredity, constitutional, psychological, sociological, and environmental - may contribute to health and vigor over the lifespan of humans.

This center's research focuses on three major questions:

1. Does nutrition influence the rate of bodily functions as people grow old?
2. Does nutrition influence the development of chronic disabilities and disorders associated with aging?
3. What are the nutritional needs of the elderly?

Grand Forks Human Nutrition Research Center: The Grand Forks Human Nutrition Research Center evolved from a concept that originated in 1963 in a report to Congress prepared by the Agricultural Research Service. That report emphasized the need for a national research program in human nutrition to identify human requirements and characterize factors affecting those requirements. As a result, the center was established and systematically developed cooperative research with scientists at the ARS Northern Region Research Center in Peoria, Illinois, the ARS Spring and Durum Wheat Quality Research Laboratory in Fargo, ND, and with scientists at the University of North Dakota. The center also has a cooperative agreement with the University of Montana and other agreements with the University of Oklahoma, Tulane University, Wright State University, and the Massachusetts Institute of Technology.

> Operational Objective: Conduct research to determine human nutrient requirements, particularly for minerals including trace elements. Research is concerned with factors, including age, sex, physiological state, and stress, that influence requirements; interactions of mineral nutrients with each other, other nutrients and non-nutrients; the physiological and biochemical consequences of mineral deficiencies; and the bioavailability of minerals from food.

This center is organized into two research groups. One group employs animal models to define nutrient functions, while the other utilizes human volunteers to define requirements. The interdisciplinary research requires cooperation among the scientists within each group and between the groups.

Western Human Nutrition Research Center: In recent years scientists have increasingly recognized the need for more sophisticated and accurate methods for assessing the nutritional status of our population to identify groups that are at high nutritional risk and to monitor changes in the nutritional status of the population as a whole. Such methods are needed particularly to evaluate the impact of Federal food and nutrition programs. To develop policies and administer progams that contribute to the health and well-being of the populace, decision-makers need greater knowledge of the factors that influence nutritional status and the biochemical indicators of nutritional health. The Western Human Nutrition Research Center was established in 1980 to conduct research in this area.

> Operational Objective: Conduct research on human nutrition requirements, and develop methods for determining nutritional status, nutrient intake, and the effects of nutritional intervention programs.

This center focuses on determining nutritional requirements for humans; developing reliable, efficient, and inexpensive methods for defining nutrient status and evaluating nutrition programs; identifying factors, forces, and trends that result in malnutrition and; supporting the identified needs of action agencies and the Department of Defense.

Human Nutrition Research and Information Management System: The development and implementation of a Human Nutrition Research and Information Management System is progressing well. Since the submission of the plan to Congress a year ago, a Task Force consisting of representatives from USDA and HHS, under the auspices of the Joint Subcommittee on Human Nutrition Research, has developed the technical specifications for the implementation of the system.

The Task Force has prepared a progress report which was submitted to the Secretaries of HHS/USDA. The report indicates that a viable system which will meet the needs of all potential users can be in place by the end of this calendar year. This will be an important tool for USDA continued planning and priority setting for Human Nutrition Research. Some specific progress that can be cited is:

1. A classification system for data retrieval has been developed and agreed upon.
2. The data elements and a detailed data base layout have also been developed.
3. A number of formats for interactive retrieval of information stored in the data base have been programmed.
4. A mechanism for transmission of data to the central file has been established.
5. Collection of data is to begin by the end of this month and the inquiry and data retrieval system will be operational by the end of the year.

Mr. Chairman, we are proud of the role we play in human nutrition research. We do commend you and the members of the Subcommittees for your interest in human nutrition research.

I am attaching as a part of my testimony a document which was prepared by a Special Analysis Team from the Agricultural Research Service, the Extension Service and the Cooperative State Research Service. This document, a Special Analysis of Human Nutrition Research, is designed to provide an in-depth look at the development of USDA's human nutrition research program.

SPECIAL ANALYSIS OF HUMAN NUTRITION RESEARCH, USDA

I. ISSUES AND CONCERNS - Nutrition is a key factor in the degree to which we achieve the genetic potential inherited from our forebears. The potentials include those for growth, reproduction, resistance to disease, longevity and intellectual development. The great array of foods now available contributes to our unprecedented opportunity to reach these potentials during longer and more productive lives. However, our knowledge of the relationship between our nutrition and the degree to which we achieve our potentials is inadequate. Our inability to specify optimum nutrient intakes for people who may be at the threshold of deficiency is a major challenge to research. We need to:

- o Establish the nutrient requirements of humans at all stages of the life cycles.
- o Compile essential data on the nutrient content of foods and determine the bioavailability of nutrients in foods as consumed.
- o Improve the nutritional status of humans and the well being of families by making techniques available to assess their needs and nutritional status and to evaluate the effectiveness of nutrition programs.
- o Utilize new techniques and educational methodologies and delivery systems, to disseminate nutrition research results and information to consumers.

II. CURRENT PROGRAMS

A. ARS - The major program in human nutrition research within Science and Education is directed by ARS. The program is organized to focus on nutrition needs during the life cycle from infancy to old age. Major components of the research program include emphasis on:

- Infant, child and adolescent populations - to determine nutrient needs for optimal growth and development, and on pregnant and nursing women to determine nutrient needs and requirements for themselves and their children.

- Adult populations - to evaluate the metabolic effects of dietary fats, sugars, protein, vitamins and minerals to determine optimal intakes, and to determine the biological functions of, requirements for, and interactions among essential nutrients and other dietary components.
- Aging populations - to determine nutrient needs, influences of nutrient intake on changes in metabolism and function of body systems, and effects of diet and nutrition on tissue function.
- Methodology and data collection programs in support of ongoing research and action programs.

To carry out this comprehensive research program, there are five research centers around the country. Each research center focuses on a major component of the overall program. In addition the ARS human nutrition program is augmented by the special expertise in laboratories located in Peoria, Ill.; Ithaca, N.Y.; Albany, Calif.; Wyndmoor, Pa.; and Athens, Ga. These laboratories concentrate on determining the nutrient composition of food and the forms in which nutrients appear in foods.

B. CSRS - The human nutrition research program in CSRS is supported through three separate funding acts:

1. Hatch Act. These funds support a broadly-based program of research through the State Agricultural Experiment Stations, with continued Federal formula funding assuring a cadre of topnotch scientists available and working on the pressing problems of agriculture, including human nutrition as the single most important consumer aspect of food production. Nutrition research

is currently directed primarily toward the determination of normal nutritional requirements as related to health, with research on determination of nutritional status and intake and on nutrient composition and bioavailability following in that order.

2. Evans-Allen. This is an annual formula-funded research program for 1890 Colleges and Tuskegee Institute established under P.L. 95-113. Food science and human nutrition projects comprise about 17% of the total, with emphasis having been primarily and appropriately on nutritional status and intake, especially of adolescent females and the rural elderly.
3. Competitive Research Grants. These were initiated in 1978 to fund high priority basic research and provide an important mechanism for involving a broader group of excellent scientists in human nutrition research. The objective of the program is to complement the efforts of ARS and the States by opening participation to outstanding research scientists throughout the U.S. scientific community.

C. ES - Under the Smith-Lever Act, the ES is charged with the responsibility to disseminate practical, useful information and instructions in agriculture and home economics, including human nutrition, to persons not attending college. The Food and Agriculture Act of 1977 and 1981 further directed Extension to teach low income families "to the greatest extent possible, information on how to buy and prepare more nutritious and economical meals and on the relationship between food and good health." Extension programs in every State, including Puerto Rico and the Trust Territories included home economics and human nutrition in their programs, allocating about 40% of their total effort to this purpose. Extension home economists provide the sole or best informed source of certain food and human nutrition information in many counties.

D. Agency Coordination. The FNS has general responsibility for administration of the following programs: The Food Stamp Program; the Food Distribution Program; the Special Supplemental Food Program for Women, Infants and Children (WIC); the National School Lunch Program; the School Breakfast Program; the Summer Food Service Program for Children; the Child Care Food Program; and the Special Milk Program for Children.

Their research and education needs are met through close coordination with ARS, CSRS, and ES. Methodologies for nutrition status assessment are of particular importance to the program development responsibilities of FNS. Research on assessment methodology and identification of factors, forces and trends resulting in malnutrition are pursued by CSRS through Hatch Funds where the emphasis includes development of reliable, efficient and inexpensive methods of defining nutritional status and development of improved methodologies to monitor and measure dietary intake. The nutrition education programs of ES support the programs of FNS by informing low-income families how to a) buy food to stretch the value of their dollars,
b) store food to minimize waste and maximize nutrient value, and
c) plan meals to meet daily nutrient needs.

III. MAJOR ACCOMPLISHMENTS

- Scientists at the Georgia Agricultural Experiment Station have discovered a defect in fatty acid metabolism in vitamin B-12 deficiency which may provide a basis for understanding the neural lesions associated with pernicious anemia and the susceptibility to respiratory infections which are characteristic of vitamin B-12 deficiency.
- An evaluation of conventional analytical methods to assess vitamin C status concluded at the HNRC in San Francisco, CA revealed that when erythorbic acid is present in the diet, plasma levels are substantially overestimated. Preliminary results indicate that a high performance liquid chromotography method presently under development will eliminate this problem. Erythorbic acid is commonly used as an antioxident by the food industry.
- A cross sectional study of 70 college students conducted at the HNRC in Grand Forks, ND has confirmed that iron nutrition is related to the electrophysiological indices of central nervous system function and cognition. The cognitive performance of the subjects was related both to iron stores indexed by serum ferretin and EEG characteristics. The findings suggests the possibility that improvement in iron nutriture will change central nervous system function and performance in demonstratively beneficial ways.
- The DNA sequence corresponding to the iron storage protein ferritin has been worked out by scientists at the HNRC at Tufts University in Boston. A series of clones of the nucleic acid for making ferritin protein were isolated in bacteria. From these clones the amino acid sequence of ferritin has been established. This will allow the

function of the nutrient, iron, in regulating storage to be investigated.

- It was previously reported from the University of Kansas that protein from processed soybeans dramatically inhibited the absorption of dietary iron in adult men. Soy protein is widely used in the U.S. in meals provided by the military in school lunches, baby formulas and many diet supplements. Consequently a long-term study involving 227 participants consuming either beef or soy-extended beef as their principal source of protein was carried out at the HNRC in Beltsville, MD. The study revealed that long-term consumption of ground beef with added soybean protein exerts little effect on the body's ability to absorb dietary iron.
- It's commonly believed that young infants lack the ability to digest and utilize cereal starches. Results from a recent infant feeding study conducted at the HNRC at Baylor College of Medicine have shown that cereal starches are well digested by the upper intestine and additionally that the colon plays a role in the efficient utilization of dietary carbohydrates. This is a significant contribution to the knowledge of the young infant's digestive processes and will lead to a possible revision of infant feeding recommendations.
- Researchers at the University of California showed that iron chelates may be superior to inorganic salts in increasing tissue iron stores of infants, thus allowing the actual amount of supplement to be reduced, to minimize possible side effects.
- Researchers at Lincoln State University were able to demonstrate that the nutrient intake of Junior High School girls who consumed the type A school lunch was significantly improved, although 40% of those to whom it was available ate less than the full type A requirement.

- The Expanded Food and Nutrition Education Program (EFNEP), initiated in 1968, has allowed Extension to use trained paraprofessionals to reach 2.1 million low income families and 5.5 million youths with intensified nutrition education.

V. OBJECTIVES

- Establish the nutritional needs for early development as well as the maintenance of bodily functions as people grow older.
- Establish the optimal nutritional needs of nursing mothers and pregnant women.
- Increase the facilities and staff capacity for using normal human volunteers of various age groups in controlled nutrition studies.
- Increase number and sensitivity of laboratory animal studies on the bioavailability of key mineral and vitamin micronutrients.
- Understand dietary interaction that can affect the bioavailability of essential nutrients and find ways of overcoming them.
- Develop new and better methods for measuring food consumption and for measuring nutrition status.
- Determine the relationship between energy expenditure and cellular processes related to energy expenditure.
- Evaluate the potential role that soils and management practices can provide to enhance the nutritional quality of plants.
- Emphasize teaching the economic and nutrition bases in food buying and food consumption for families and youth in EFNEP.
- Use new technology and media to expand outreach of food and nutrition education to consumers.

VI. EXPECTED RESULTS: The base program has the potential for improving the health and well-being of large segments of the U.S. population. There is still inadequate knowledge of nutrient needs of people at different ages, levels of physical activity and health status, and of the consequences of inadequate or excessive levels of nutrient intake. Dietary factors may contribute to the development and progession of the degenerative processes associated with aging. The elderly account for 30 percent of health care expenditures, most of which are public funds. Research is needed to identify nutrient requirements during aging and the ways in which an optimal diet, in combination with hereditary, constitutional, psychological, sociological and environmental factors may contribute to health and vigor over the life span of an individual.

The importance of human nutrition research in USDA goes beyond its direct impact on the health and well-being of all Americans. By developing knowledge of population needs and consumption patterns, the program provides essential information to help guide other research programs targeted at developing new and improved food products through such means as gene manipulation and plant and animal breeding. The program is also closely related to other research focused on activities such as food processing and marketing, since an important aspect of that work includes preserving the quality of food products, including nutrient content, after they leave the farm gate.

Another important area affected by the human nutrition research program involves the regulatory activities associated with the nutrition labeling carried out by other agencies such as the Food and Drug Administration and the Food Safety and Inspection Service. The scientific knowledge provided by the human nutrition research program, provides an essential part of the knowledge base needed to develop appropriate and cost effective regulations. Knowledge developed by the research program could also assist in identifying existing regulations which may not be needed or could be made less restrictive.

Knowledge of the bioavailability of nutrients in food will overcome a major obstacle to making sound dietary recommendations by nutrition educators and health professionals.

The knowledge generated by the program also serves as the undergirding base of research for human nutrition education and action programs in extension and other agencies. Such knowledge also provides for the dissemination of such information and materials on a regular basis to state educational agencies and other interested governmental and private organizations. Knowledge of the special needs of infants and pregnant and lactating women will be used directly by the Women, Infants and Children Supplemental Food Program. Knowledge of the needs of children and long-term effects of nutrition on health maintenance will be used immediately by programs such as the Child Nutrition Programs and EFNEP. Similarly, knowledge of the nutrition needs of the elderly will be directly applied in food programs and health-care programs for that group.

DR. ORVILLE G. BENTLEY

Orville G. Bentley serves as the Nation's first Assistant Secretary of Agriculture for Science and Education. He was sworn in October 19, 1982, by Secretary of Agriculture John R. Block.

The South Dakota native is responsible for directing and evaluating the U.S. Department of Agriculture's role in the food and agricultural sciences. The creation of this position represents a new commitment to place increased emphasis on the development of science and technology needed to expand the production of food, fiber, and forest products to meet domestic and export needs at reasonable prices while maintaining our natural resources for future production.

Prior to assuming office, Dr. Bentley had served as Dean of the College of Agriculture at the University of Illinois since 1965. He has been active in national and international agricultural affairs for many years. He was a presidential appointee to the Board for International Food and Agricultural Development, Department of State.

Before joining the University of Illinois at Urbana-Champaign, Dr. Bentley was Dean of the College of Agriculture and Biological Sciences and Director of the Agricultural Experiment Station at South Dakota State University, Brookings.

Dr. Bentley earned his bachelor of science degree from South Dakota State College in 1942 and his master of science and doctoral degrees from the University of Wisconsin in 1947 and 1950, respectively. He served in the Army during World War II, attaining the rank of Major.

Mr. WALGREN. Thank you very much, Dr. Bentley. Mr. Brown.

Mr. BROWN. Mr. Chairman, could I yield to Mr. Panetta, who has not had an opportunity to ask questions of the previous witnesses? He may have time problems.

Mr. WALGREN. Mr. Panetta.

Mr. PANETTA. Thank you.

Mr. Chairman, first of all, I appreciate your introducing my testimony in the record in my absence, and I also thank both of you for conducting these hearings. I think they are extremely important to the whole area of nutrition in trying to determine what the status is of the efforts by the various agencies involved.

Maybe to begin these hearings, we probably ought to have something that lists an organizational chart to find out where the hell all of these task forces are and what relates to what.

Let me ask a very basic question. You have a lot of task forces, you have a lot of studies, you have got a lot of workshops, you have got a lot of coordination efforts going on. Can somebody tell me what is the status of nutrition in this country at the present time?

Ms. JARRATT. Mr. Panetta, I don't think we can give exactly quantitative assessments for individual target groups, but I do think that the population as a whole has an adequate food supply, it is at a lower cost than almost anywhere else in the world, the quality is quite good. We have evidence that our assistance programs have helped alleviate poverty related hunger in this country. So we probably have more need now to look at the quality of the food intake rather than—because we have, I think, met our obligations to see that people have adequate resources available to have food accessible in their homes.

Ms. Wolf will speak a little bit more specifically to what we gather from the food consumption survey.

Ms. **Wolf**. I was just going to say that we do have data available from the 1977-78 food consumption survey, that is analyzed upside down and backwards and inside out, and that we have a great deal of detailed information on the nutritional status of a number of segments of the population.

We use this information then to conduct some of our educational programs to help us to develop food plans for various segments of the population. We do have a considerable amount of information, Mr. Panetta, and we would be very glad to supply your office with it.

Mr. **Panetta**. That is not my concern. My concern is getting that information out to the American people.

I guess that one of the problems I have is that there seems to be an awful lot of research that goes on and a lot of information gathering, very little of which reaches the American people.

Ms. **Jarratt**. If you are referring to the numbers of publications or whatever that we provide that directly translates this material, I am not sure that that is the best mode of assessment, because we are not the only communicators of that information. When we gather results from the study or whatever, our way of dealing with the general public generally is to try to train the professional, to get the information to the professional, who then, in turn, may deal on an individual way, or perhaps in a group setting with groups of individuals.

We at the Department are not the only disseminators of the results of information that is gathered about nutrition. That comes from the food industry, from various professional societies, from medical associations, and so forth. So I don't think that looking at one separate issue, whatever it is a number of publications or whatever, might be the best measure of that.

The Department is striving to come up with a number of different ways that we can address the nutrition information needs of the public without confining it necessarily to publications. In video teleconferencing, I think, public service announcements on TV, some of which are sponsored by the Government, some of which might be sponsored by a food company, for example, are ways of getting that information out.

Mr. **Panetta**. Go ahead.

Dr. **Bentley**. Mr. Panetta, if I may, I would like to reflect a bit over time on what is happening in nutrition in the United States. I realize that it is almost dangerous to answer your question, because there is always an exception to the question.

But when I first started out as a student, a biochemistry student, at the University of Wisconsin, we were talking then about deficiencies. We had just come off the time when people discovered vitamin B, an understanding of vitamin A, a number of nutrients such as this. They had at that time created specific nutritional problems that were serious, at least for certain parts of the country and certain parts of the world.

We have largely in the United States gone away from that. That is why it is hard to make a sweeping statement, because you can always find exceptions to that particular statement. We have gone away from that concern now to where we are addressing more of the issues that relate to health—that is, the relationship of protein, food intake that is protein, energy, carbohydrates, nutrients, their bioavailability, and so forth.

It is my impression that we have a Nation that is much more in tune and concerned about those kinds of issues now then we were, say, 20 years ago. I think that is a good sign and a good indication.

Let me finish by saying that one of the programs that was encouraged by the Congress, and certainly has been supported, has been the expanded food and nutrition program of the Extension Service. Here you find that it has been possible to bring nutrition information to people who sometimes are harder to reach—they might be in the low-income groups, but not necessarily—and that this has helped a great deal to make people conscious of nutrition needs and the importance of a balanced diet.

I think all of those are positive steps, in addition to the expanded food and nutrition program. There has been a longstanding commitment of the Extension Service to education work and foods and nutrition. In my career, I have seen it come from a time when it was an area that didn't get attention to one that is receiving its appropriate attention now. I take that as an indication of progress.

Mr. WALGREN. Would the gentleman yield?

Mr. PANETTA. Yes, I would be pleased to.

Mr. WALGREN. Just a note for the record that the person who would probably most appropriately respond to Mr. Panetta's question is no longer with us in this hearing. We particularly invited Mr. Lyng because there are areas that go beyond the individual disciplines that you two individuals have focused. I have seen witnesses come before the Congress who had extremely pressing time commitments for very large matters and stay to both benefit from the hearing and to provide the type of insight that would be very helpful. I, particularly, am disappointed that Mr. Lyng did not choose to do so.

Mr. Panetta.

Mr. PANETTA. I thank the chairman. I, too, would have appreciated it, although I have a feeling that Dick Lyng would have probably allowed the other two to respond to the question.

Let me reflect my concern. We have been conducting hearings around the country. I think we all have a sense that people in the middle and upper income brackets in this country generally are much more aware of diets and nutrition. It is my sense from the hearings that that is not the case with low-income families. As a matter of fact, at several of the hearings there was testimony that one of the problems is that low-income families that are receiving nutrition assistance from the Federal Government one way or another—food stamps, the other programs that are available—are not receiving adequate nutritional information to guide them in the purchase of food.

Indeed, in a couple of hearings, there was testimony that in fact, anemia was on the increase with regard to low-income children, in part as a consequence of poor diet.

I guess, my concern is that in all of this, I think a major thrust in this country ought to be directed towards providing proper nutritional information, particularly to people who have limited diets to begin with. I don't see that in all of the documentation that has been presented here.

Ms. Jarratt. Mr. Panetta, that is probably the biggest problem we have in the food assistance programs, and certainly that is one of the major complaints we hear about them, that either the users or the public not using, but seeing the use of the food stamp program perceives that the benefits aren't being used as they deem they should be used.

One of the reasons that it is difficult to deal with, as you know, is that the case load is constantly changing and the benefits are delivered in a welfare setting where the interest is more in eligibility determination, perhaps, than in helping counsel the recipients in the best use of that dollar.

Ms. Wolf here to my right, who is the Administrator of the Human Nutrition Information Service, has been going around to our seven regional offices conducting workshops called "Making Your Food Dollars Count," where we actually go through the grocery store and demonstrate how is it possible for one to live on the food stamp allotment. We have invited a number of people to those regional workshops. They are nutritionists, extension people, and so forth. The idea is for those people, with that information gleaned there, to go back and hold workshops in their individual communities.

Clearly, I think, television is our best mechanism for communicating with this population, because we could send out something with the food stamp allotment and say there will be a public service program or there will be something on cable TV, or whatever, at a given time, and in your area tune in then. That might, in the long run, be cheaper than trying to do printed materials. We do not believe that the printed publication should be outruled, but it is not the best mechanism, or the cheapest one for that matter, in all cases for dealing with these needs.

We are exploring within the Department right now ways that we might perhaps begin public service work on television or get some companies to help sponsor nutrition counseling, not just for food stamp users, but for anyone interested in purchasing at a low level of expenditure than what we are doing now. It is much easier for us to deal with nutrition objectives for school lunch, for example, or WIC because they are specifically designed messages for target portions of the population where we can hone in on the deficiency of that target group. With the food stamp case, you may be dealing with the infant all the way up the grandmother in the family. So it is a much more general message. In some ways, some of the kinds of things we need to communicate aren't too different than what we need to communicate to the general public.

Mr. Panetta. Let me follow up on that, because there was testimony in some of the hearings that clearly prove that, with regard to the feeding program for women, infants, and children, which does include a nutrition element, that the doctors who testified said that is, by far, the best element of the program because it not only provides the food for mothers, but it says that this is the kind of food you ought to be eating right now, which is of tremendous assistance to them.

That, I guess, is my concern. I would like to see that expanded to other areas because I think it is needed at the present time.

Ms. **Jarratt**. That is probably the strongest component of the WIC program, and it helps to find recipients who might need further medical counseling or whatever. That is delivered, as you know, basically through the Public Health Service, and it is a different kind of environment than we have in the food stamp situations.

Clearly, if there are ways to get a better health intervention for food assistance dollar that we are delivering, we need to be looking at any possible mechanism. But I don't think we ought to overlook educational methods outside of the certification site.

Mr. **Panetta**. Dr. Bentley, did you have any comments?

Dr. **Bentley**. If I may, I would like to just say that this whole matter of nutrition education is a difficult field to be in because there are a lot of different contravening messages that come to the consumer that is seeking information. Then there is a whole series of cultural attitudes about food, about consumption patterns, and so on. It is like in many areas, there is a great deal of information that is not used. If a person like myself should know that I shouldn't take in as many calories—it is obvious that I take in more, I know better, but I still do it. I think this is kind of a national question.

Yet, I go back to my original statement, I think there is a great deal more consciousness through a whole series of efforts, whether it be from health or from feeding programs. I am encouraged, but I agree with you that it is a much needed area of emphasis, and we will have to continue to work on it in years ahead.

Mr. **Panetta**. I thank the chairman for allowing me the time.

Let me just comment generally that we are spending a good deal of money in this area, and it is my sense that what tends to happen is that administrations come and go. They reorganize the area and, by the time the reorganization is completed and everybody understands what the hell they are supposed to do, they are just about developing the information that really is going to have an impact, and another administration comes in and decides that it is important to reorganize the approach. Then you start the whole process over again.

I am getting a little sick and tired of reorganization, that then leads to testimony that says a whole series of studies are going on, and it is going to provide an awful lot of information. But nothing ever happens. I really have to say that, in terms of all of the distribution of information and the kind of impact that I think ought to be taking place, that it is just not there.

You have a lot of things leading up to good things. They may ultimately happen. But if another administration comes in and goes through the same rigmarole of deciding that they are going to reorganize the whole thing, it will never happen.

I guess what I am saying is that, in the last study that was done in 1977-78 on the status of nutrition, I just think that is something we ought to be doing more regularly. I think we ought to be directing that information at the poor. We know enough about nutritional needs. I know there is a lot of debate about specifics in this area, but we have some broad areas of consensus that people ought to know about that they don't know about right now. I think that, at the very least, we ought to be providing that kind of information to people.

I just want to see when this kind of hearing is held again—and I assume it will be—I just want to be able to see concrete results that show that, as a consequence of what we are spending and what the Department is doing, in fact, the nutritional status of people is improved.

Thank you.

Mr. **Walgren**. Thank you, Mr. Panetta.

Mr. MacKay.

Mr. **MacKay**. Dr. Bentley, I am not sure whether my level of ignorance has gone up or down since this meeting began, so I will give you the same disclaimer that I gave the last panel.

You are the person in charge of nutrition research in the USDA; is that a correct assumption?

Dr. **Bentley**. Yes, among other things, among science and education. The active agencies, of course, are the ones, through the Agriculture Research Service—and there is a Cooperative Grants program and the Extension Service. So, in a sense, yes.

Mr. **MacKay**. Is USDA designated as the lead agency for nutrition research, as far as the Federal Government is concerned?

Dr. **Bentley**. This is my recollection. Yes, it is. It has been designated as the lead agency for nutrition research. This was an action taken by the committees—I don't know. I haven't been in this current spot very long. Since 1977, I believe.

Mr. **MacKay**. I gathered from the comments that were made by the last panel that your budget for nutrition research must be some part of $40 million—not all, but some part. In other words, they said the total spent by the Federal Government is $190 million, and they were spending $150 million, so you are some part of the other $40 million.

Dr. **Bentley**. That is right. That is our total, yes. That is right.

Mr. **MacKay**. Do you, in deciding what you will fund out of your millions of dollars, take into account projects that NIH has already funded?

Dr. **Bentley**. The answer to that is yes, because as far as the exchange of information, scientific information, listing of projects, and so forth, we have access through the reporting service—one of the activities that has been taking a great deal of time is to get a system for getting the reporting of projects and programs.

In terms of missions and assignments of responsibilities, to our nutrition centers within the USDA or the ARS are in specific areas. As we have pointed out, we are working with aging at one center, with infants and lactating mothers, an so on. So, yes, we have that, and we do take that into account. We look to our program leaders to do that as they plan and utilize the funds.

Mr. **MacKay**. I was very much interested in the report that was attached to your testimony. I am not quite sure I understand what the group is that made that report. What is that committee, and how authoritative is that report? If that is what was going on, could we assume that that speaks for your agency?

Dr. **Bentley**. Let me make a general comment, and then turn to Dr. Therriault for some additional information.

One of the responsibilities that I have is to try to bring together the activities within the science and education group, and facilitate communication—encourage communication. It is probably a more important job, a more important area of responsibility.

So, from time to time, we ask ad hoc groups to get together to summarize the status of programs and what is happening and what the interaction is and identify problems that need attention. So this was done as an ongoing thing, but it was certainly done recently as we thought about preparing material for this group.

So it does represent people who have program responsibilities in the Cooperative State Research Service, the Extension Service, the ARS—and I don't recall if they had anybody from the National Agricultural Library or not.

I would now like to turn to Dr. Therriault for comments.

Mr. **MacKay**. What I want to find out is of what significance is this report, who is bound by it, or what good does it do, other than it is very persuasive when it is presented to a congressional committee?

Dr. **Bentley**. Communications, yes.

Dr. **Therriault**. The Agricultural Research Service is the lead agency within USDA for the research, and research and nutrition is part of that. On a yearly basis, we do special analyses because we, unlike the National Institutes of Health, are primarily an intramural program of research. Rather than making our resources available to the scientific community, we plan and direct research toward certain accomplishments that we wish to achieve.

This special analysis that you are looking at is a yearly endeavor of the Agricultural Research Service to set priorities for its research and to lead it in its program planning. Since nutrition is not the sole consideration of the Agricultural Research Service, we coordinate these special analyses with CSRS and with Extension, with the Competitive Grants program, and whatever other agencies there are who have active interest in nutrition research. That activity—the final result is this publication that is before you.

It is an attempt, therefore, to identify the issues in human nutrition research that are appropriate for the USDA to address, how the USDA will address these. It is the basis for our Administrator to set what increases he would generate for the next fiscal year's budgetary needs in the area, and also serves for information to our policymakers at all levels of the USDA.

Mr. **MacKay**. I think it is an excellent report. In fact, it is a very concise statement, as I see the problem, of what the problem is. What I want to find out is, now that you have it, what, if anything changes?

Dr. **Therriault**. What changes here is that, within the Agricultural Research Service, we are forming our budget requests for the fiscal year 1985 based, not solely on this, but in part on this analysis.

Mr. **MacKay**. Is it appropriate for me to ask you the same question that I asked the last panel, which is what percent of your total research dollars are going into nutrition research, and is that percentage going up or down?

Dr. **Therriault**. Presently, the percent of Agricultural Research Service dollars going into nutrition research is 7 percent. This, from our strategic plans and the implementation plans over the next 6 years, is slated to go to a level of 10 percent, assuming that the budget of ARS remains constant, which means that there is an attempt to redirect funds from other programs into human nutrition in order to attain what we would consider to be a well-balanced program in agricultural research.

Prior to this year——

Mr. **MacKay**. If I might ask, what percent is going into research on better production methods, mechanization, productivity?

Dr. **Therriault**. That is an area that we label as postharvest technology. I am not sure what the percentage of our budget is there, but I suspect that it is more than 10 percent.

Mr. **MacKay**. Which is the greatest problem, do you think, facing the country considering another agricultural program is trying to cut down on production?

Dr. **Therriault**. I don't think you can separate both problems. They go hand in hand. Postharvest technology involves all of the processes that our commodities go through before they reach the American public as a food, and human nutrition research deals with——

Mr. **MacKay**. I am sorry. I misunderstood your answer.

I was asking what portion of your research dollar goes into producing more quantity of crops per acre?

In other words, are we still trying to solve the problems of the 1930's?

Dr. **Bentley**. The answer is "no." The percentage figures—I can't give them. I can give them to you by breakdown. I don't have them in my mind.

Mr. **MacKay**. Let me just ask you this: Is it more than 7 percent?

Dr. **Bentley**. Oh, yes, it is more than 7 percent. It is perhaps in the range of 40 percent.

Mr. **MacKay**. Then how can the answer be "no"?

Dr. **Bentley**. Because the research in agriculture has to do with productivity and meeting and maintaining the supply, as well as increasing yield. But there is much that needs to be done just to maintain the efficiency of production and productivity of the American agricultural system that comes about as a result of new technology, new problems—insect problems, disease problems, et cetera—for which the Department of Agriculture has had a longtime tradition of responsibility. So part of this is a part of our total responsibility.

Now, when you look at the—you have to think about the budget, though, for the agricultural research system. There are the State agricultural experiment stations that get a portion, about 15 to 18 percent of their funds, to form the program, to support the research. The rest of it is coming from other grants, but mainly from the State resources. That has a somewhat different mix, and is more related to the unique needs of a given State and the industry within that State.

So, yes, we are continuing work on productivity of agriculture, and this is a very important industry in the United States.

Mr. MacKay. I am involved in agriculture. I am not at all sure that I am in it for a living because it doesn't earn me any money, but I am involved in it. Most of my mortgages are involved with agriculture.

So I am very sympathetic to what you are saying, but I am trying to ask the question: Who, then, as a policy matter, would make the decision if you don't have enough money to do everything? Are you putting enough into the issues identified in this special analysis? This, it seems to me, is a very key issue.

Dr. Bentley. Yes.

Mr. MacKay. What are the nutrition needs of people from birth to death, how do they change, and how do you make it a healthier population?

Dr. Bentley. Yes.

Mr. MacKay. Is there a conflict between that which is part of your responsibility, and the responsibility to try to produce more food per acre?

Dr. Bentley. No, I don't see that as a conflict. In fact, there has been a policy decision made that we will want to increase the amount of money that we will be putting into nutritional programs. As was pointed out, if the budget stays static or there is no increased funds, some of that will have to come about through redirection of effort. That is what we are going through right now, a rather painful process of reviewing our program and setting a 6-year goal, that will be reviewed on an annual basis.

We have already made one move in this one set of recommendations in that area, that is within ARS, and we have made a decision that we think that this is an important area. It impinges on food safety, as well as on nutritional value, our nutrient values, the bioavailibility, and the nutrient needs of different age groups. All of these kinds of questions, we think, need more attention.

Moreover, it has important benefits to the programs that Secretary Jarratt was talking about. It also has an important bearing in relationship to our regulatory activities carried on, in FDA, and so on. We see this as an important area, and we think we should expand it. There are all these traditions and trends that you have to live with, but, over time, we have to make an adjustment.

Sir, I want to be sure that you understand that when I say this of redirecting funds, you immediately raise questions in the minds of those who are concerned with production problems, marketing problems, postharvest technology, and so on. We have to think about the soil and water questions, the conservation of soil, and all of these. So it does require us to study, perhaps sometimes more than people think we need to. But we also want to understand that we don't wish to project the feeling that we are all going in these areas either, and that even though we have recommendations, we want to study them through.

But it is our position that we want to move to more work in the nutritional area. Whether it is an adequate or an appropriate amount, of course, that is a matter of debate. But this is our policy position.

Mr. MacKay. If you are the lead agency, then that means that other agencies feel that they must not have the primary responsibility since you do. And if your expenditures in total are already substantially less than NIH, and if you are saying that your response to what could be a heightened awareness of nutrition—and that is what this report says—then I think it is appropriate for me to say to you that a 3-percent increase from a 7-percent base in 6 years ain't much of a response. If that is all you can do, you must be pretty hidebound.

Is that a fair comment?

Dr. **Bentley**. I might be hidebound, but I don't think——

Mr. **MacKay**. That might not be a good word. Maybe captive to vested interest groups.

Dr. **Bentley**. No. I would suspect that I feel that, within the constraints and the budgets I have, that this will take considerable effort to make it 3 percent. That is still a 50-percent adjustment. It will take effort to do this.

Mr. **MacKay**. From my side of the table, what you are really saying is nothing is going to happen in my lifetime, but hang loose, because it may help my kids.

Dr. **Bentley**. No. I would hope that we could get some additional funds.

Mr. **MacKay**. In the meantime, we are going to produce a lot more food.

Dr. **Bentley**. Yes, we will produce more food, but what we have to do, though, is to be sure we retain the productivity of the American system so that we don't fall behind in our competitive position in the world market. That is part of the dimension as well.

I would hope that as time—if we can do a better job of talking about these needs, we can get some additional funding, both in the ARS budget, the in-house organization, but in the agriculture experiment station budget, the Competitive Grants program, where we think the institutions we represent have some unique characteristics that will contribute to understanding of nutrition and developing the kind of information that you seek, we must be mindful of, though, and we want to work with, HHS, that has a much larger budget in this area. I hope that we can make progress within the constraints that we have. But I am sure that we can use more funds in that, but that is one of the difficulties we have.

Mr. **MacKay**. But it would be very difficult to redirect existing funds.

Dr. **Bentley**. Yes, it is always difficult to redirect funds, but we are doing that. We will be doing some redirection of funds. We have provided some additional funds to get the program going at Tufts, to expand the program at Grand Forks, to support the program that we have at Baylor, at Albany, and at Beltsville. We think those are good moves.

Mr. **MacKay**. I don't mean to say they are not. I am just saying that with that much——

Dr. **Bentley**. We should do more.

Mr. **MacKay** [continuing]. Promise, this is not much of a response.

Thank you, Mr. Chairman.

Mr. **Brown** [presiding]. Thank you, Mr. Mackay.

Actually, I would like to have Mr. MacKay continue, because he is really your ally in this overall fight, Dr. Bentley.

Mr. **MacKay**. I think I am, too.

Mr. **Brown**. Dr. Bentley has been struggling very hard to project a 6-year plan for research which would make some of these adjustments, and he is running into difficulties, probably both internal and within the Congress, that object to making changes in the status quo. The bulk of the sentiment in the Congress probably would support a continuation of programs aimed at increasing productivity and having more farmers go broke as we produce more, and spending less on frills like nutrition research.

We will not have time to go into as many of the aspects of this as I would like, Dr. Bentley. I am satisfied that you are making an honest effort to increase the resources devoted to nutritional research. However, I agree with Mr. MacKay that, in light of things like a $200 billion health bill for this country, or even a $30 billion, $40 billion, or even a $50 billion agricultural bill for all of the many programs that we have, the total of $200 million that we are spending on nutrition research is probably not an adequate response. It takes a fresh outlook like Mr. MacKay has to look at it in this broad sense, and say maybe the priorities are a little bit distorted. I hope others will share his views.

I am not happy completely with what has been going on within the Department in nutrition research. I made that clear before, so I won't belabor it. I am not happy with what you are proposing to do at Tufts, for example, or what I think you are proposing to do. I will be discussing that with you further.

I am not happy with the fact that you have not just the one position that you mentioned you were trying to fill, but a number of top-level nutrition positions which you haven't filled over a considerable period of time. Most of that time was before you got here, and they are still vacant.

You or Ms. Jarratt may comment on that, if you wish. Some are within her jurisdiction. But my perception is that when an organization is not enthusiastic about a program, they find all sorts of ways not to fill the positions in it. This bothers me a little bit.

Mr. **Bentley**. Mr. Brown, I can assure you that is not the reason that the positions are not filled. We find it difficult—well, there is a lot of competition for the kinds of people we are looking for. Within ARS, as I mentioned, we think that we are close to getting this position filled, and the position within the Extension Service. There has been an announcement of positions, and we have been having difficulty getting people to express an interest. For the short term, we have gone into some programs, in cooperation with the States—that is, before, we have been able to get some expertise and shared expertise. We think that we can do this. But we are still seeking to get a permanent person in this position.

Within CSRS, there has been one review cycle. There has been one offer made. It was thought that we had successfully recruited a person. The decision was later made that she wouldn't—this happened to be a lady—she would not accept the position, or should not accept it. Now we are in the process of going to the review. I am encouraged in the report that we will have a positive response there in a short while as well.

So I share the frustrations that you have about getting people, but we are sure going to keep trying at it. I guess the thing I can say to you is that, on all of these areas, you have my personal commitment that we will keep working to resolve it.

Mr. **Brown**. Do you wish to comment, Ms. Jarratt.

Ms. **Jarratt**. The same status with us.

Mr. **Brown**. We will ask you to give us a written report on that, if you don't mind. But I don't want to take up more time right at this point because we have one other additional panel to hear this morning.

[The information follows:]

Dr. Mary Heltsley
Home Economist and Program Coordinator for Food and Social Sciences
GM-15/5
Administration and Management for Science Programs
Cooperative State Research Service
vacant 8-29-83
filled 10-31-83

Dr. Gerald Combs
Assistant to the Deputy Administrator for Human Nutrition
GM-630-15 Nutrition Series
Agricultural Research Service, National Program Staff
vacant 3-7-83
filled 10-3-83

Agriculture Extension Specialist
GM-14
National Program Leader, Foods and Nutrition
Extension Service
vacant Nov. '82
Current Status: Presently vacant; position was advertised during FY 83 but no selection was made. Present plans are to readvertise during FY 84. (During this period of vacancy, there have been short-term contracts with State Extension Services to provide professional coverage for this position.)

Associate Administrator
Human Nutrition Information Service
GS-15
Vacant August, 1981
Current Status: Position was established in August, 1981, as a Schedule C position. On September 9, 1983, the position was converted from Schedule C to career. Applicants were recruited and applications accepted through October 24 (OPM recruitment until October 28).

November 14, 1983

SUBJECT: Questions Regarding Human Nutrition Positions

1. re: Dr. Jack Iacona and Dr. Jerry Combs
The position held by Dr. Jack Iacona was eliminated through the reorganization of SEA into S & E. Nevertheless, the duties of the position now held by Dr. Combs are very similar to those once performed by Dr. Iacona. The lack of qualified applicants caused the delay in filling this position.

2. re: Dr. Betsy Davis and Dr. Mary Heltsley
The situation is as described above. The positions are similar in function yet different in title as defined by reorganization of SEA to S & E.

3. re: Ritva Butrum
She left her position in June of this year for another job. We are having difficulty finding a replacement for Ritva as this position requires a person of level 14 qualifications.

Mr. **Brown**. I want to express my thanks to all of you for your contribution. Your statements have been very helpful. We will continue to keep in close touch with you, as I am sure you know.

Ms. **Jarratt**. Thank you.

Dr. **Bentley**. Mr. Chairman, we thank you, too.

We realize there are a lot of questions that have come up. We hope we can continue the dialog. It is very important to us.

Mr. **Brown**. Dr. Bentley, I have a whole sheet here that I didn't get around to.

[See followup questions and answers, appendix B, page 205.]

Our last panel this morning is a panel representing the academic, industrial and science communities. It includes Dr. Malden C. Nesheim, director of the Division of Nutritional Sciences at Cornell; Dr. Irwin Rosenberg, professor of medicine at the University of Chicago; Dr. Gilbert Leveille, director of Nutrition and Health Sciences at General Foods; and Dr. H. David Hurt, who is chairman of the National Nutrition Consortium.

We certainly appreciate your being so patient this morning, gentlemen. We hope we can finish up by 1, with a little discipline on the part of the members of the committee.

We invite you to proceed in the order that I called you. Dr. Nesheim.

STATEMENTS OF MALDEN C. NESHEIM, PH. D., DIRECTOR, DIVISION OF NUTRITIONAL SCIENCES, CORNELL UNIVERSITY; IRWIN H. ROSENBERG, M.D., PROFESSOR OF MEDICINE, UNIVERSITY OF CHICAGO MEDICAL CENTER; GILBERT A. LEVEILLE, Ph. D., DIRECTOR, NUTRITION AND HEALTH SCIENCES, GENERAL FOODS CORP.; AND H. DAVID HURT, Ph. D., CHAIRMAN, NATIONAL NUTRITION CONSORTIUM, INC.

Dr. NESHEIM. Thank you very much, Mr. Chairman.

I have submitted written testimony to the committee and, thefore, I will try to just summarize what I have put before you.

Mr. BROWN. In each case, the full text will appear in the record.

Dr. NESHEIM. Thank you.

I direct an academic unit in nutritional sciences. So, therefore, I am involved in the use of much of the Federal resources that are made available for research in human nutrition. So from that perspective, I bring a slightly different view to what the situation in the Federal support of nutrition might be compared to the panels earlier today.

We are extremely dependent upon Federal support for nutrition research to be able to carry out the research that our faculty are interested in doing, that we have a strong commitment in doing. In our own department, for example, about 88 percent of the research funds that we have available come from Federal sources, and only about 12 percent from industry and other sources.

Most of this—the vast majority of it—comes from NIH, reflecting the larger NIH budgets for nutrition. A smaller proportion comes from USDA. Because of our strong commitment in international areas, we also have research support from USAID.

I have outlined in my testimony some of the areas which I think are important in nutrition today, and I break these into basically three separate categories. Within that, there are several ways in which one has to approach questions of nutrition. That is one of the problems. This subject gets so fragmented within the Federal Government, it gets fragmented within universities, and it is a difficult to organize.

For example, we feel that much of the approaches that are important, particularly from the population of the United States, are those that deal with health and the dietary practices in relation to health, and all of the chronic diseases of aging, and so forth, that are involved. We have to undertake very basic biological approaches to understanding those things, but nutrition also needs to look at populations and where they are living, so we take epidemiological approaches. We need research also in areas that help us understand how to translate some of that information into programs and policies that will, in fact, have an effect upon public health of this country.

We also are concerned about the problems of the developing world. If you look outside of the United States, we find that protein-energy malnutrition, nutritional anemia, vitamin A deficiency, iodine deficiency causing endemic goiter—these are major public health problems in the world today. I think that the United States as a world power can't ignore the human cost of this malnutrition worldwide, and has both a moral and economic interest in participating in the alleviation of this world problem. The international issues involved in nutrition include these biological, as well as the social, economic, and even the political issues as to how these are to be taken care of.

Within the United States, I think we need a greater amount of research. We need to increase our efforts in program management and how to evaluate nutrition programs. I think that it is a real shame that we in the nutrition community and others working with it can't come before the Congress and give you some really good information as to how all of the money that the Congress has appropriated for many of these programs is, in fact, really impinging upon the nutritional status of our population. So I think this is an important area of research and we must continue it.

We can also look at the problems when we look at international issues in nutrition. We tend to look at them that way. But I think also that we need to look at them as a division between problems of those who are rich and those who are poor.

We have just completed a study assessing the growth of children in the United States which is based upon data collected in the first and second HANES surveys, for example, and we can demonstrate that we can still show clearly demonstrable poverty-related growth deficits in our children in this country. There is something about our poverty environment that prevents the full expression of a child's biological potential, and nutrition certainly is a component of that.

The problem of support, then, for nutrition within the Federal Government and what agencies are involved has been discussed a great deal as to how these are coordinated and this sort of business. Let me just make a couple of comments about the various agencies that we look to for support.

NIH, or Health and Human Services primarily through NIH, conducts extramural programs that support nutrition research. We look for support for nutrition in the programs of practically all of the NIH institutes. I support that concept, that nutrition is a component of the programs of practically all of the NIH institutes, and we need to continue to look for support in that way.

The diffuse support for nutrition through NIH, however, has made it difficult to maintain support for some activities that strengthen the ability of the biomedical research community to carry out nutrition research. So, from that perspective, many in the nutrition community—and I would like to join in that plea—that some kind of center for nutrition be established within NIH, within one of the existing institutes. We are not asking for a new institute, but within one of the existing institutes—a greater focus for nutrition within NIH be established.

We are particularly concerned with the problems of NIH that were discussed with Dr. Wyngaarden about the difficulties of maintaining numbers of research grants and, at the same time, individual grants are being cut because the resources are not there to continue to cover the costs of this research in the way that we have expected that we needed to have it covered, and also the loss of centers and training moneys are of serious concern in terms of NIH's support.

I also think—and I make a strong plea in my testimony—that NIH could play a greater role in supportive research that deals with the problems of nutrition in the developing world. I think that we have begun to neglect—not only the United States, but in many other developed countries of the world—whole issues of tropical medicine, some of the issues dealing with health problems of developing countries. If we don't, I think, put a little bit more emphasis on that, our own capabilities here in the United States are going to suffer in the long run.

In terms of USDA, the role of USDA in human nutrition research has been expanded in recent years, and particularly with the development of the intramural research centers, such as the units administered by the Agricultural Research Service, I think these centers are a valuable national resource, and I strongly am in favor of their continued support.

I would like to make my comments primarily in relation to the extramural support for research from NIH because that affects me more directly in terms of our faculty and our departmental support.

I have attached to my testimony another report which is a subcommittee of the Experiment Station Committee, which I served on, which had analyzed the extramural support for human nutrition research by USDA over the last few years. Much of the extramural research in USDA is supported by formula funds that come to agricultural experiment stations. Over the last few years, only about 3.9 percent of the formula funds going to State agricultural experiment stations have gone into human nutrition research.

Mr. MacKay. Would you say that again, please?

Dr. Nesheim. About 3.9 percent of the Hatch and Long-Evans or the 1890 formula funding that comes to agricultural experiment stations has actually gone into human nutrition research. This is a reflection of local priorities and local agricultural experiment stations as to how it is allocated to individual investigators wanting to do nutritional research. That is a relatively limited amount. But when we look at around 1982, there were around $2.8 million in competitive grant funds in human nutrition. That represented 46 percent of the extramural funding available to the nutrition community at large through the CSRS funding that came out of USDA. So it is only $2.8 million, but it was almost 50 percent of the available funding.

That message, to me, is clear that if the Congress is interested in increasing USDA's commitment extramurally to human nutrition research, the way to do that is to increase the competitive grants program because that is going to get into the hands of those who want to do human nutrition research.

Mr. Brown. Did you speak to your local Congressman about that?

Dr. [illegible]esheim. I think that we will get support from our local Congressmen about that.

The other thing I called attention to relative to USDA was the fact that USDA does have a major commitment for extension education. It is one of the tenants of our land grant system that we put together research and extension to carry out this program of research and bring it to fruition by a program of extension education.

I think that the linkage there between human nutrition research funding and extension has fallen down. I don't think we are putting enough resources into the research that is going to enable the extension to be done properly, and particularly even in methodologies that are involved in this nutrition education, and so forth.

I also have a statement of support for the Food Consumption Surveys and the HANES surveys. I think those are very important. I was glad to see that the Department said that they were supportive of them. I would like to make sure that the funding, and so forth, of that in fact reflects that support, and that they in fact can go ahead.

Then I would like to call attention to my concern also, as someone outside the Federal departments, that I would like to see the human nutrition staffing of both the Health and Human Services and the U.S. Department of Agriculture really improved. The lack of a senior individual on the national program staff and the ARS has been felt by those of us outside. Dr. Kinney has been extremely supportive of nutrition research, and I don't want to imply any criticism of him in this regard. But I do think that we desparately need to have some expertise at that senior level in the Department in human nutrition.

The CSRS, which we interact with at experiment stations, has lost practically all of its human nutrition people, and I would like to see those restaffed—and Extension Service as well.

I appreciate the opportunity to bring some of these things to your attention today. Thank you very much.

[The prepared statement of Dr. Nesheim follows:]

PREPARED STATEMENT OF M. C. NESHEIM

Good morning, Mr. Chairman, I am pleased to have the opportunity to present some ideas relative to the role of the federal government in nutrition research. I am Director of the Division of Nutritional Sciences at Cornell University, an academic unit which is the largest of its kind in the United States dealing with research, teaching and extension in Human Nutrition.

We have a strong commitment to Human Nutrition Research and through activity of Division faculty we receive about $3,500,000 annually in Federal research funding. These funds come primarily from USDA (21%), NIH (44%) and USAID (23%). Smaller amounts of research funding comes from National Science Foundation and from private industry and foundations. New York State contributes some $680,000 to this research, primarily in the form of faculty salaries. This in practical terms shows that the federal government plays a major role in funding human nutrition research in the United States.

I believe that Human Nutrition as a major component of public health will continue to be a major research and policy issue for at least the remainder of this century in the United States and will deserve continued federal support. Some of the research issues needing attention include:

1. The relationship of dietary practices to health and chronic degenerative disease such as cancer, heart disease, obesity, diabetes, hypertension and other diseases of aging. Understanding these relationships and developing strategies for broad public health solutions will involve a variety of approaches including:

a. Biological approaches to understanding the etiology of chronic disease, including approaches at the molecular level, study of metabolic regulatory processes and the interaction of nutrients with these metabolic processes, particularly as influenced by nutrient deficiency and nutrient excess. Those involved in nutrition must understand and use the latest techniques of modern biology as reseaqrach tools.

b. Epidemiological approaches: in addition to the biological and molecular level research, nutrition/chronic disease relationships must also be understood in an epidemiological context. Therefore, the epidemiological studies in nutrition for understanding etiology and dietary relationships will become increasingly important and less emphasis will be put on large scale intervention studies.

c. Public policy research: the studies on etiology, carried out at the biological or epidemiological level raise issues of public policy dealing with intervention strategies, nutrition education, and how food policy and social policy issues impact upon the nutritional practices and nutritional well being of the population.

2. Problems of malnutrition in the developing world. Protein-energy malnutrition is probably the major public health problem in the world today. Other extremely prevalent and important forms of malnutrition include nutritional anemias, vitamin A deficiency (a leading cause of blindness in children), and endemic goiter due to iodine deficiency. The United States, as a major world power, cannot ignore the human cost of malnutrition and has both a moral and economic interest in participation in the alleviation of this major world problem. The research agenda on the international issues include:

a. Biological factors related to malnutrition, including relationships to environmental factors such as disease, parasitic infection and nutrient deficiency.

b. Further understanding the relationship of malnutrition to functional outcomes such as infant mortality, learning disabilities, worker productivity, pregnancy outcome, and population social organization.

c. The relationship of malnutrition in the developing world to social, demographic and economic factors, including alleviation of poverty, policy and planning issues, interventions, family planning and program management.

d. The trial and evaluation of intervention strategies (including food programs, fortification, nutrition education, control of infections and parasitic diseases, the protection of breast feeding, etc.) designed to improve the nutritional status of communities and populations.

3. The development of improved programs and techniques for planning, implementation, and evaluation of nutrition programs and nutrition policies. We have not done a good job of assessing our nutrition intervention programs in the U.S. in spite of our large federal commitment to them and we must commit a greater research and development effort to improve our abilities to assess program benefits.

Although this discussion of research issues in nutrition in the years ahead, separates major issues of nutrition research into those of developed countries such as our own and developing countries, a better division might be between people that are poor, and those with adequate resources. We have just completed a study assessing the growth of children in the U.S. based on data collected in the first and second Health and Nutrition Examination Surveys (HANES). The data from these surveys, carried out in the early and late 1970s, clearly show poverty related growth deficits in children, indicating that the poverty environment even in the United States still prevents full expression of a child's biological potential. Part of this environment is related to adequate nutrition.

The support for the research outlined above, does not come from a single agency of the federal government but is scattered throughout several federal agencies. Organization of nutrition programs and policies within the federal government has been difficult because of the varied nature of the issues facing nutrition and the multidisciplinary expertise needed to carry out appropriate research and to manage research programs. Agency coordination of programs so that there is clear responsibility outlined for various aspects of nutrition research continues to be a problem in the federal system. These problems were outlined in several reports to the Congress in the late 1970's[1, 2] and they apparently still exist today. The recent abolishment of the "Joint Subcommittee on Human Nutrition Research" suggests that appropriate coordination mechanisms have still not been found and I hope some new mechanism will be forthcoming to replace the Joint Committee that will insure communication among federal agencies involved with Human Nutrition.

In the context of the research agenda I have just outlined I wish to make some comments as to Federal support of nutrition research from my perspective in an academic department involved broadly in many of these areas or research.

The Department of Health and Human Services, primarily through the NIH continues to support nutrition research and remains the major source of support for basic nutrition studies. Support for Nutrition properly

---

1. General Accounting Office, National Nutrition Issues CED-78-7 Dec. 1977.

2. Office of Technological Assessment, Nutrition Research Alternatives, 1978.

comes from nearly all of the NIH institutes and I am strongly in favor of continuing to look for support for human nutrition research throughout the various NIH programs. Such broad NIH involvement has received strong congressional support in the past and I hope this support will be continued.

The diffuse support for nutrition throughout NIH, however, has made it difficult to maintain support for activities that strengthen the ability of the biomedical research community to carry out nutrition related research. Support for nutrition training, clinical nutrition research units, areas of basic nutrition research not specifically disease related needs continued attention and strengthening. Therefore, I also support suggestions made by many in the nutrition community that a Center for Nutrition be established within one of the existing NIH institutes. Such a Center provided with specific budgetary allocations would insure that the research and training needs in nutrition would receive adequate support and that priorities for training and basic nutrition research would receive specific attention. This focus for nutrition within NIH is even more critical in today's funding climate. While NIH has been able to maintain total numbers of individual research grant awards relatively constant, grant budgets have been cut in the face of rising research costs, and training and center grants have suffered even greater reductions.

I also believe that the NIH could play a much greater role in support of research that is highly relevant to nutrition problems of developing countries. Malnutrition and disease are partners in most of the tropical areas of the world. These two problems together retard development, and make it more difficult for developing countries to properly use economic aid. Much of the developed world, living in temperate climates has reduced support for research in tropical diseases, parasitic infections, and associated nutritional deficiency disease. Much of current support for such research comes from the Agency for International Development, but AID is not specifically charged with support of the basic biological research needed to deal with such problems. The US capability to maintain expertise in areas of tropical disease and nutrition problems of the developing countries of the world is declining and will continue to do so without greater support for basic biomedical research in these areas.

The role of the USDA in human nutrition research has been expanded in recent years, particularly with the development of several intramural research centers as units administered by the Agricultural Research Service. These centers are a valuable national resource for research in Human Nutrition and I am strongly in favor of their continued support.

USDA support of extramural research in human nutrition has been modest. Considering the role of the Department in food programs, food policy, and Nutrition education, I believe the research underpinnings of these programs is inadequate and must be expanded. Much of the research dealing with nutrition education, program evaluation, nutritional assessment, and nutrient requirements has been the domain of USDA and HHS has not provided much specific support for these research areas. Suppport from USDA for applied nutrition research has substantially declined in the past 2 years, just as appropriate research expertise was being developed in these areas in US universities.

Extramural USDA funding has been primarily through the formula funds granted to agricultural experiment stations. An analysis of such funding, carried out in 1982 by a sub-committee of the Experiment Station Committee on Policy (ESCOP) is attached to this testimony. This report shows that relative to ARS commitments to Human Nutrition research, allocation of State Experiment Station funds to human nutrition research is very modest, only about 3.9% of the total. This is a reflection of local priorities of agricultural experiment stations for limited funds. Competitive grants in human nutrition while only a very modest 2.8 million dollars in 1982 represented about 46% of the total extramural USDA research funding through the Cooperative State Research Service. Clearly, the way for USDA extramural funding for human nutrition research to be increased is by increasing the allocation for competitive grants. I strongly support this along with a broadening of the research areas these grants will suppport to reflect the full range of human nutrition responsibilities of the USDA.

The USDA has a major commitment to human nutrition education through the Cooperative Extension Program. Nearly 25% of the extension service funding (Smith Lever & EFNEP) is committed to human nutrition. Since the USDA extramural human nutrition research commitment is a considerably lower proportion of the total USDA research funding, the traditional link between research and extension that has characterized the very successful partnership between USDA and the states is not adequately developed for human nutrition.

The USDA has had a major role in assessing food intake patterns of consumers for many years. The USDA Food Consumption surveys and the HHS, Health and Nutrition Examination Surveys (HANES) represent basic epidemiological tools for assessing changes in food patterns, changes in nutritional status, and associations of health, food patterns and many socioeconomic variables within the United States. Such surveys are useful to a wide group of research concerns, for targeting groups with health and nutrition problems and for assessing long range health and food consumption trends in the United States. I wish to strongly urge continued support of these programs and the implementation of plans to coordinate USDA and HANES surveys.

I have a further concern to voice relative to current federal activities in human nutrition research. Individuals identified with human nutrition research and who bring experience and stature in the field are lacking throughout the executive branch . In the USDA, the ARS has had no senior level human nutrition researcher as part of the national program staff for some time. Although the administration of the ARS has been very supportive of human nutrition research, coordination within the ARS and cooperative efforts with universities need the presence of a senior administrator, in human nutrition in the ARS. Similarly the CSRS has lost most of its human nutrition staff who have not been replaced. Within HHS, the position of special assistant to the Secretary of HHS for Human Nutrition has been vacant for the past 2 years. These critical vacancies along with the demise of the Joint Subcommittee on Human Nutrition Research which provided representation within the Office of Science and Technology Policy makes me concerned about current federal priorities for continued support of critical needs in Human Nutrition Research. I hope this is the wrong interpretation of the situation and that these personnel vacancies will soon be filled.

As a researcher and administrator within the field of human nutrition, I am grateful for the opportunity to present my views to you this morning.

Funding of Human Nutrition by Formula Funds

The United States Department of Agriculture has played a major role in human nutrition research in the United States for more than 50 years. The 1977 Farm Bill clarified the USDA responsibilities in human nutrition and designated USDA as a leading federal agency[1/] for human nutrition research. This commitment of the Department to human nutrition was reaffirmed in the 1981 Agriculture and Food Act. Over the past five years the Agricultural Research Service funding for human nutrition research increased nearly threefold, from about $11 million in 1976 to $31 million in 1981. In addition to the Human Nutrition Center at Beltsville, new human nutrition centers were opened in Boston, Houston and San Francisco, and the Grand Forks laboratory was expanded.

A similar increase in support for the human nutrition mission of USDA has not occurred within the land grant college system. This paper, prepared by the ESCOP Human Nutrition Subcommittee, analyzes funding trends within the land grant system and points out funding needs. In our analysis, a strict definition of the term "human nutrition research" is employed. While it is recognized that many aspects of agricultural research are important to human nutrition, our analysis of

---

[1/] The Food and Agriculture Act of 1977 (PL 95-113) designated the Department of Agriculture as the lead agency of the federal government for the food and agricultural sciences. These were defined as sciences relating to food and agriculture, "...in the broadest sense, including the social, economic and political considerations of ... human nutrition." (Sec.1404(8)(E)). Sec.1405 restates the "lead agency" role for agricultural research, then modifies it to say, "...except with respect to the biomedical aspects of human nutrition concerned with diagnosis or treatment of disease...." The Agriculture and Food Act of 1981 (PL97-98) amends Sec.1404(1)(8)(E) to read "food and nutrition." The statement in Sec.1405 is not altered.

the human nutrition research effort supported by formula funds is limited to the direct support. We did not include research in other areas such as food science, microbiology, plant genetics, and food toxicology that may be related to human nutrition.

Funding for human nutrition research and extension via USDA appropriations for the period 1974 to 1983 is shown in Table 1. From 1974 to 1982, total support for human nutrition from Hatch and 1890 (Evans-Allen) appropriations increased from $4,236,000 to $6,314,000. The 1890 funding over this period remained constant, while Hatch funding increased about $2,000,000. Over the same period, the total Cooperative State Research Service (CSRS) budget increased from $90,545,000 to $232,103,000. During the same period total Hatch and 1890 funding increased from $80,897,000 to $165,880,000. Thus, formula funding for human nutrition made up about 5% of the CSRS funds in 1974 while the percentage of these funds used for human nutrition had declined to 3.9% by 1983 and support for human nutrition within the CSRS system of formula funds had actually declined as a percent of total funding. The decrease was primarily in 1890 funding, which declined from 2.9% to 1.5% of the formula funds, while Hatch funding for human nutrition remained relatively constant at 2.3% of total over this period. The failure to commit increased formula funds to human nutrition contrasts with the situation of the Agricultural Research Service, where the commitment to human nutrition showed a very marked increase.

Competitive grants for human nutrition, initiated in 1978, amounted to $5,000,000 a year in 1978 and 1979, but decreased to about $3,000,000 a year after that. These funds are included in total funds for human nutrition for CSRS over this period, but some competitive grant funding has gone to other than the land grant colleges. Even including competitive grants, there has been a decline in the percentage of total CSRS funds used for human nutrition, from 4.7% in 1974 to 4.1% in 1983. In 1978 when competitive grants were established, CSRS funding for human nutrition reached 7.3% of total CSRS funds, but this has declined to 4.1% in 1983.

The competitive grants program has been of considerable significance to the human nutrition community within the land grant system. In 1982 the appropriation of $2,880,000 for this program amounted to about 46% of the total available for human nutrition research through CSRS. However, as noted, all the competitive grants funding does not go to land grant schools. In 1982, competitive grants amounting to $1,319,000 were awarded to schools also receiving USDA formula funding. Although this represented only 47% of the $2,793,600 awarded that year, it was still 21% of the total CSRS formula funds used for human nutrition research. For this reason the human nutrition community has been strongly supportive of competitive grants.

The traditional land grant concept has closely linked research and extention. However, human nutrition extension has had a much more visible USDA commitment than human nutrition research. Of the total Extension Service funds (Smith Lever and EFNEP), human nutrition has received 23 - 25% each year since 1977, as contrasted with the 4 - 7% of the total CSRS funds received by nutrition research. The research commitment thus seems inappropriately low and is cause for concern.

The argument is sometimes used that human nutrition research has access to NIH funding and thus should need less assistance from USDA. However, NIH funding is primarily disease oriented, and much nutrition research dealing with healthy people does not receive consideration for NIH funding. On the contrary NIH generally does not fund certain areas of human nutrition research because of Agriculture's responsibilities in those areas. Studies of nutrient bioavailability, nutrient interrelationships, nutrient composition of foods, nutritional requirements for optimal health and methodology for nutrition education are among key research areas not usually supported by NIH. The most recent USDA competitive grant competition received 136 proposals for nutrition research. Only 27 of these were funded of which 13 were from land grant colleges. Such data show that nutrition researchers have significant ideas for research, but only a small proportion receive funding.

There are significant issues dealing with human nutrition that need attention in the years ahead. For example, findings of new research techniques make it likely that significant advances in understanding nutrient bioavailability can be made. The use of stable isotopes for human studies has made such research possible, but funding is needed to equip laboratories for it. Advances in research dealing with energy balance and weight control are exciting, and new ideas and research approaches offer hope for better understanding in this area. For U.S. researchers to contribute to research on energy balance, it is essential that research centers in universities be provided with capability for human calorimetry. Food program management by USDA requires new and improved methods for monitoring and assessing nutritional status, the development of which should be funded by the USDA. For such population assessments, better data are needed on nutritional requirements, and variations in human nutritional needs, as well as sensitive ways of determining the functional consequences of nutrient deficiencies or imbalance. Land grant colleges and universities of the United States have well trained scientists to carry out research in human nutrition and to train future research workers provided support is available. This subcommittee hopes that the resources of the USDA - State partnership system can be used to further the mission of the USDA as a leading agency in human nutrition research.

A further mechanism for support for human nutrition research was identified in the Agriculture and Food Act of 1981 (PL 97-98 Title XIV). It would initiate a program of long-term research funding to establish cooperative human nutrition program centers to focus resources, facilities, and scientific expertise on particular high priority nutrition problems. The centers would be at State cooperating institutions having a demonstrable capacity to carry out human nutrition research and education.

The objective of the centers is to strengthen human nutrition research and the training of experts badly needed in human nutrition. The centers would be a strong supplement to the concept of competitive grants for higher education, and would concentrate the integration of priority research and training efforts in highly selected departments. This concept should receive strong support.

The ESCOP Human Nutrition Subcommittee has prepared this material to bring together information on human nutrition funding by USDA over the past ten years and to consider future needs. The committee believes that formula funding allocations should reflect USDA funding priorities and mission relative to human nutrition. The committee also urges that ESCOP recognize the importance of state experiment stations' support of human nutrition and encourage experiment station directors and research directors at 1890's institutions to consider increasing it through allocations of available formula funding.

Prepared by ESCOP Human Nutrition Subcommittee
M. C. Nesheim
Patricia Swan
Marjorie Woodburn
Judith Driskell
Troy Wakefield

September 30, 1982

USDA HUMAN NUTRITION FUNDING FOR RESEARCH AND EXTENSION ($ 000)

	1974	1975	1976	1977	1978	1979	1980	1981	1982 (est)	1983 (est)
Cooperative State Research Service Total Funding	90,545	101,688	114,460	129,022	143,148	174,395	186,031	200,897	221,216	232,103
Hatch and 1890	80,897	88,860	97,640	111,325	123,219	125,426	136,351	147,885	162,511	165,880
Human Nutrition Funds										
Hatch	1,850	2,151	2,229	2,875	2,954	2,743	3,275	3,512	3,880	3,973
1890's (Evans-Allen)	2,386	2,379	2,170	2,344	2,485	1,219[a]	1,903	2,112	2,434	2,455
Human Nutrition as % of total CSRS Hatch & 1890's	5.0	5.1	4.5	4.7	4.4	3.2	3.8	3.8	3.9	3.9
Competitive Grants					5,000	5,000	2,900	3,000	2,880	3,000
Other, including Special Grants		301	374	112	106					
Agricultural Research Service Total Funding				281,589	317,884	340,416	372,573	416,367	425,678	468,548
Human Nutrition Funds	6,933	8,353	11,036	13,969	15,508	22,008	30,456.8	31,595	25,206[b]	27,644[b]
Extension Service Total USDA Extension	204,073	215,523	225,935	241,906	257,562	263,899	274,037	292,269	315,702	311,911
Nutrition Extension										
Formula Funds (Lever)	8,879	10,087	9,942	9,942	10,108	10,108	10,758	11,862	12,816	12,816
EFNEP	47,360	50,560	50,560	50,560	50,560	51,810	51,810	50,015	60,354	60,354
Total Human Nutrition Extn.	56,239	60,647	60,502	60,502	60,668	61,918	62,568	66,877	73,170	73,170
Nutrition as % of total	27.6	28.1	26.4	25.0	23.4	23.5	22.9	22.9	23.1	23.4

---

[a] Reflects shift to formula funding (outlays from prior year grants are not included).

[b] This figure does not include funds for the new human nutrition information service which amounted to $8,732,000 in 1982.

Mr. **Brown**. Thank you, Dr. Nesheim.

Dr. Rosenberg.

Dr. **Rosenberg**. Thank you, Mr. Chairman. I am really grateful for this opportunity to participate in this joint hearing on the role of the Federal Government in human nutrition research. I certainly commend the two subcommittees for their vigorous and continuing oversight of Federal approaches to the maintenance and improvement of the nutritional status and health of this population.

In addition to my position at the University of Chicago, I am at present the president of the American Society for Clinical Nutrition and, on July 1 of this year, I completed a 2-year term as chairman of the Food Nutrition Board of the National Academy of Sciences/National Research Council.

So I think I have a perspective based on some years of involvement in human nutrition research and teaching and policymaking at the national level to realize that it is so important for the Federal Government to continue to strive for an overall plan which will foster research in this critical interdisciplinary field, and to transfer that research promptly into a state of improved health.

Thus, I was surprised and somewhat distressed to learn of the projected termination of the Joint Subcommittee on Human Nutrition Research. The Joint Subcommittee is the only Federal body of which I am aware which has the representation of all of the relevant agencies of the Federal Government involved in the important task of human nutrition research. And because of the critical need for coordination, if implementation is to be facilitated, and with an eye to improving efficiency and minimizing unnecessary but sometimes inevitable overlap, such a coordinating body seems to be a highly desirable, if not essential, function of Government.

My concern with the possible termination of the Joint Subcommittee was not simply theoretical. I have interacted with the Joint Subcommittee in my capacity as Chairman of the Food and Nutrition Board, as an officer of the American Society for Clinical Nutrition, and mostly as director of one of the seven university-based and federally funded Clinical Nutrition Research Units. I will have a bit more to say about those clinical nutrition research units in a moment.

I was particularly attracted, among the many useful functions of the Joint Subcommittee, with its possible goal of establishing an overall Federal plan for human nutrition research. At the meeting which the Joint Subcommittee sponsored last December and which all the federally sponsored nutrition units were represented, I came to realize how important this subcommittee was in drawing together the expertise of not only the federally funded community, but the scientific expertise in universities, in research institutes, and in the private sector into really formulating the core of the knowledge that could form the basis of a true coordinated Federal plan.

I wonder whether any mechanism which might be proposed to replace the Joint Subcommittee will have the same broad scope and reputation so as to be able to draw together the important elements of human nutrition research from the public and the private sector. If not, then the important momentum created by the meeting last year in its aftermath will certainly have been dissipated.

I had referred earlier to the Clinical Nutrition Research Units, and they have been brought up for some discussion previously. I think I would like to comment a bit more on that, if I may have some more time to do so.

With increasing public and professional interest in the role of diet and nutritional factors in the prevention and treatment of disease, and the need for increasing expertise among practicing health professionals, and for better nutrition knowledge within the public, both the DHHS and the USDA, the lead agencies in nutrition research, have been involved in an extensive program supporting basic and applied nutrition research, which we have heard about this morning.

The USDA, with congressional mandate, has established three new human nutrition research centers in addition to the two USDA research centers previously functioning very effectively in Beltsville, Md., and Grand Forks, N. Dak. By congressional action, funding was made available for construction of new buildings. We heard from Dr. Bentley that $32 million was available for one of the centers and for acquisition of scientific personnel and continuing research.

The NIH is somewhat different in this regard. In the absence of any specific congressional mandate—and such a mandate, I would strongly argue, is badly needed—the NIH responded to rapidly advancing needs in human nutrition information and research with its own new multi-institute program designed to foster interdisciplinary research and training in human nutrition. Since this program has been in competition with all other programs at the NIH, as we heard earlier, its funding has been modest, $2.73 million for seven units in fiscal year 1983. But its accomplishments have been most gratifying.

The NIH program provides core grants for Clinical Nutrition Research Units to medical schools and medical centers which are intended to complement and enhance existing NIH-supported research projects and training awards in the area of human nutrition.

Seven centers were awarded 5-year grants beginning in 1979 and 1980 by a selection utilizing the peer review system of the National Institutes of Health. The seven were the University of Alabama, the University of Chicago, Vanderbilt, the Medical College of Georgia, the Memorial Sloan-Kettering Cancer Center in New York, the University of Wisconsin, and Columbia University in New York. Five of these centers were supported by the National Institute of Arthritis, Diabetes and Digestive and Kidney Diseases, and two by the National Cancer Institute.

I am sorry to have to report that, despite an extraordinary set of accomplishments that have persuaded essentially everyone of the success and importance of this program, this key and innovative program in human nutrition research is now in some considerable jeopardy.

The problem is a familiar one to all of us. The NIADDK has a long history of commitment to and support of nutrition research. Dr. Lester Salans, the new Director of the National Institute of Arthritis, Diabetes and Digestive and Kidney Diseases, is fully committed to strengthening of the Institute's program in nutrition.

Dr. Salans has initiated a search for a new Director of Intramural Nutrition Research in the Institute who might also oversee a branch or division relating to extramural nutrition research. At present, the nutrition program in that institute is only one of several programs within the Division of Digestive Disease and Nutrition. Perhaps that organization deserves to be looked at.

Not only is the NIADDK committed to this upgrading of intramural and extramural nutrition, but it has been highly supportive of the program for these five CNRU's. However, the budgetary limitations have been described which are faced by this institution as elsewhere. The CNRU's, which were funded with tight budgets at the outset, have been cut by 8.5 percent, and then 6 percent in the last 2 fiscal years, bringing some of the programs to the margins of viability.

Furthermore, in the commendable effort to maintain a constant number of scientist-initiated research grants in the face of diminishing resources—and as someone who benefits from both the scientist-initiated research grant program and the nutrition center program, I certainly am not opposed to scientist-initiated research grants. I think they are important. But I don't understand why both of these cannot be given important attention and priority. That in the face of that push and pull, the present administration has forced the NIH in fiscal 1984 to start no new centers and to discontinue those that are in a position of competitive renewal. Perhaps that is not no new centers, but certainly a significant decrease in the numbers. Thus, two of our CNRU's are faced with the possibility of mandatory termination in 1984, and the remainder could well follow a similar course thereafter.

Thus, we have a situation in which a program which has met and even exceeded all expectations in fostering interdisciplinary research in human nutrition, in expanding the scope of nutrition education and training, and in providing materials for public nutrition information. By the way, I will happy to submit for the record the latest yearly report of the CNRU's which clearly documents these accomplishments.

Mr. Brown. Would you do that, Dr. Rosenberg?

Dr. Rosenberg. I will be happy to do that.

[See appendix C, page 257.]

Dr. Rosenberg. This program has experienced diminishing funding and probable extinction unless Congress expresses its mandate on behalf of the CNRU's.

In the House of Representatives Appropriation Committee report in 1980 relating to the fiscal year 1981 budget, the committee did note "this commendable initiative by the NIH," and said that the committee "will watch the development of nutrition research at NIH with considerable interest and expects to be informed from time to time with the progress being made." I hope that that committee is not going to have to be informed that the CNRU's are going to have to be terminated for lack of funding.

Mr. Brown. Those committees are going to rescue you, Dr. Rosenberg.

Dr. Rosenberg. I am happy to hear that.

So, I have taken a good deal of time to focus on this one element of the emerging Federal plan for nutrition research. This was a program in which I am personally involved and, therefore, my arguments may not be totally objective. Still, I am sure that the Government has gotten much more than its money's worth from the program at my university, and I am convinced that the same thing is true of others. Such a program would not be in jeopardy if it were part of an overall Federal plan, such as the Joint Subcommittee on Human Nutrition Research was working to formulate and to which we all look for guidance.

The need for such a plan and for interdisciplinary coordination is evident. I sincerely hope that the Federal mechanism to accomplish these goals is retained. And I am sure that I speak for my colleagues in nutritional sciences and the American Society for Clinical Nutrition when I say that we stand ready to do everything in our power to work toward an effective Federal plan which will lead to improved health and nutritional status in the American population.

Thank you.

[The prepared statement of Dr. Rosenberg follows:]

Prepared Statement of Irwin H. Rosenberg, M.D., President, American Society for Clinical Nutrition, and Sara and Harold Lincoln Thompson, Professor of Medicine, Director of Clinical Nutrition Research Center, University of Chicago

I am Irwin H. Rosenberg, Professor of Medicine, Director of the Clinical Nutrition Research Center and Co-Chairman of the Committee on Human Nutrition and Nutritional Biology at the University of Chicago. I am at present the President of the American Society for Clinical Nutrition and on July 1st of this year, I completed a two year term as Chairman of the Food and Nutrition Board of the National Academy of Sciences/National Research Council. I received my bachelor's degree at the University of Wisconsin, my M.D. degree at Harvard University and my post-doctoral training in internal medicine, nutrition, and gastroenterology at Harvard University at the National Institutes of Health.

Because of this involvement for some 20 years in human nutrition research, teaching, and policymaking at two universities and at the national level, I am grateful for this opportunity to participate in this joint hearing on the role of the federal government in human nutrition research and I commend the two sub-committees for their vigorous and continuing oversight of federal approaches to the maintenance and improvement of the nutritional status and health of the American population.

Let me begin by stating how important I consider it to be that the federal government continue to strive for an overall plan which will foster research in this critical interdisciplinary field and translate research advances promptly into a state of improved health and well being of the American population. Nutrition is by its very nature a cross disciplinary science. It draws heavily on a scientific base of biochemistry, physiology, genetics and molecular biology, and incorporates the more applied scientific disciplines of public health, preventive medicine, and the clinical sciences. No single university department or research institute and no single segment of the federal government can encompass the full process of turning improved scientific insights into practical programs of health and nutrition. Thus, I was surprised and somewhat distressed to learn of the projected termination of the Joint Sub-committee on Human Nutrition Research (JSHNR) of the Federal Coordinating Council for Science, Engineering and Technology. JSHNR is the only federal body of which I am aware which has representation of all the relevant agencies of the federal government involved in the important task of human nutrition research. Because of the critical need for coordination if implementation is to be facilitated, and with an eye to improving efficiency and minimizing unnecessary but sometimes inevitable overlap in functions, such a coordinating body seemed to be highly desirable if not essential.

My concern with the possible termination of the JSHNR was not simply theoretical. I have interacted with the Joint Sub-committee in my capacity as Chairman of the Food and Nutrition Board, as an Officer of the American Society for Clinical Nutrition, and mostly as Director of one of the seven university-based and federally funded clinical nutrition research units (I will have more to say about these clinical nutrition research units in a moment). From each of these perspectives, I have found the JSHNR to be serving useful functions in the coordination of federal human nutrition research activities and in fostering activities in nutrition research, education, and training so essential for the maintenance of a scientific establishment in human nutrition. A good example of the scope of the coordinating function of the Joint Sub-committee was the Annual Conference of Federally Supported Human Nutrition Research Units which was organized and sponsored by the JSHNR last December. This conference brought together directors and leaders of units involved in human nutrition research throughout the federal government, from NIH, from USDA, from FDA, from Veterans Administration, from the Department of Defense, and from the Agency for International Development. This meeting was encouraging in view of the broad range of human nutrition research activities which are supported by the federal government, and particularly useful for creating new opportunities and channels for interdisciplinary and inter-institutional collaboration and problem solving. As a clinical nutrition scientist and as Director of a clinical nutrition research unit, I was particularly attracted by the possibilities for continuing interaction. I wonder now whether any mechanism which might replace the JSHNR will have the same broad scope and reputation so as to be able to draw together the important elements of human nutrition research, those which are federally funded and those which are funded by private industry and other private foundations. If not, then the important momentum created by the meeting last year and its aftermath will have been dissipated.

One of the other very hopeful developments which emerged from the Conference of Federally Supported Human Nutrition Research Units was the realization that the Joint Sub-committee had gathered together a group of scientists and administrators which could form the core for an effort to develop a Federal Nutrition Research Plan. I know that such a goal was recommended by the Comptroller General of the United States to the OSTP for action by the JSHNR. As one who has been involved in policy deliberations within the Food and Nutrition Board and as an Officer of the American Society for Clinical Nutrition which is made up of the leading scientists and educators in clinical nutrition and human nutrition research, I am acutely aware of the need for such a federal plan. I could envision the Joint Sub-committee drawing on the scientific expertise in the federally supported human nutrition units and more widely upon the expertise in the nutrition community at universities, research institutes, and industry to create a national strategy for human nutrition research. Such a plan might include critical approaches to methodology and in time to a work plan which could rationalize federal support and optimize the efficient use of federal dollars. Once again, I must ask whether any body which will be set in place to replace the

JSHNR will have the broad intergovernmental and interdisciplinary scope to attract the broadest expertise to this task set for the JSHNR by the Government Accounting Office and, in turn, by the Office of the Science and Technology Policy.

I have referred earlier to the clinical nutrition research units which are supported by the National Institutes of Health as one of the important components of the current program of federally supported human nutrition research. This new and innovative program has had the vigorous support of the staff of the JSHNR which has viewed the program as a key element in an emerging federal plan. With your permission, Mr. Chairman, I would like to finish my testimony by some special reference to the accomplishments of the clinical nutrition research units and to my concern that they may not be permitted to play as important a role in the future of human nutrition research as was once hoped.

With increasing public and professional interest in the role of diet and nutritional factors in the prevention and treatment of disease, the need for increasing expertise among practicing health professionals and for better nutrition knowledge within the public has become apparent. Both the DHHS and the USDA, the lead agencies in nutrition research, have long been involved in an extensive program supporting basic and applied nutrition research, but both have recently recognized the need for the creation of scientific units which could properly span the scientific gaps between basic and applied research so as to facilitate the translation of scientific progress into improved health and nutrition. The USDA with congressional mandate has established three new human nutrition research centers in addition to the two USDA research centers in Beltsville, Maryland and Grand Forks, North Dakota which previously existed. By congressional action, funding was made available for construction of new buildings, for the acquisition of scientific personnel, and for continuing research budget support. In the absence of any specific congressional mandate (and such a mandate is, I believe, badly needed), the NIH responded to the rapidly advancing needs in human nutrition information and research with its own new multi-institute program designed to foster interdisciplinary research and training in human nutrition. Since this program has been in competition with all other programs at the NIH, its funding has been modest ($2.73 million dollars for seven units in fiscal 1983) but its accomplishments have been most gratifying. The NIH program provides core grants for clinical nutrition research units to medical schools and medical centers which are intended to complement and enhance existing NIH supported research projects and training awards in the area of human nutrition. The specific objectives of the CNRUs were: 1) to create or strengthen foci and biomedical research institutions for multidisciplinary research in clinical nutrition in order to develop new knowledge about specific nutrients in health, human development and the prevention and treatment of diseases; 2) to strengthen training environments in order to improve the education of medical students, housestaff, practicing physicians and perimedical personnel in clinical nutrition; and 3) to enhance patient care and promote good health by focusing attention on clinical nutrition and generating nutritional information for the public.

Seven centers were awarded five year grants beginning in 1979 and 1980 by a selection utilizing the peer review system of the National Institutes of Health. The seven were the University of Alabama, the University of Chicago, Vanderbilt University in Tenneessee, the Medical College of Georgia, the Memorial Sloan-Kettering Cancer Center in New York, the University of Wisconsin, and Columbia University in New York. Five of these centers were supported by the National Institute of Arthritis, Diabetes, Digestive and Kidney Diseases, and two by the National Cancer Institute.

I'm sorry to have to report that despite an extraordinary set of accomplishments that have persuaded essentially everyone of the success and importance of this program, this key and innovative program in human nutrition research is now in some jeopardy.

The problem is a familiar one. The NIADDK has a long history of commitment to and support of nutrition research. Dr. Lester Salans, the new Director of the National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases is fully committed to strengthening the institute's program in nutrition. Dr. Salans has initiated a search for a new Director of Intramural Nutrition Research in the Institute who might also oversee a branch or division relating to extramural nutrition research. At present, the Nutrition Program is only one of several programs within the Division of Digestive Disease and Nutrition. Not only is NIADDK committed to this upgrading of intramural and extramural nutrition research within his Institute, but it has been highly supportive of the program of clinical nutrition research centers of which the NIADDK supports five. However, there are budgetary limitations as faced by other administrators in government and elsewhere. The CNRUs, which were funded with tight budgets at the outset, have been cut by 8-1/2% and then 6% in the last two fiscal years bringing some of the programs to the margins of viability. Furthermore, in the commendable effort to maintain a constant number of scientist-initiated research grants in the face of diminishing resources, the present administration has forced the NIH in fiscal 1984 to start no new centers and to discontinue those that are in a position of competitive renewal. Thus, the first of our CNRUs, at Vanderbilt, is faced with the possibility of mandatory termination in 1983; the remainder could well follow a similar course.

Thus, we have a situation in which a program which has met and even exceeded all expectations in fostering interdisciplinary research in human nutrition, in expanding the scope of nutrition education and training, and in providing materials for public nutrition information (I'll be happy to submit for the record the latest yearly report of the CNRUs which clearly documents these accomplishments) is experiencing diminishing funding and probable extinction unless Congress expresses its mandate on behalf of the CNRUs. In the House of Representatives Appropriation Committee Report in 1980 relating to the fiscal 1981 budget, the Committee did note "NIH has taken a commendable initiative during the past several years in fostering research on nutrition which has been curiously neglected by the scientific community and about which far less is known than one could deduce from the steady stream of popular publications on the subject. The National Institute of Arthritis, Metabolism and Digestive Disease and several other institutes have now launched a joint effort to establish clinical nutrition units at medical schools and teaching hospitals to increase clinical nutrition research and teaching, and to upgrade utilization of nutrition knowledge in clinical practice. The Committee will watch the development of nutrition research at NIH with considerable interest and expect to be informed from time to time of the progress being made."

So this critical element in an overall federal agenda on human nutrition is currently in some jeopardy unless Congress takes some action which provides some support for this program in the future. Indeed, the continuation of the current programs or others that substitute for them by competitive application would be a worthy but insufficient goal. There should, I believe, be at least 10-15 of these highly cost-effective NIH supported nutrition centers around the country if the potential of this program is to be fully realized.

I've taken a good deal of time to focus on this one element of the emerging federal plan for nutrition research. This was a program in which I am personally involved, and, therefore, my arguments may not be totally objective. Still, I am sure that the government has gotten much more than its money's worth from the program at my university and I am convinced that the same thing is true of others. Such a program would not be in jeopardy if it were part of an overall federal plan such as the Joint Sub-committee on Human Nutrition Research was working to formulate. The need for such a plan and for interdisciplinary coordination is evident. I sincerely hope that the federal mechanism to accomplish these goals is retained and I am sure that I speak for my colleagues in the nutritional sciences and in the American Society for Clinical Nutrition when I say that we stand ready to do everything in our power to work toward an effective federal plan which will lead to improved health and nutritional status in the American population.

Mr. **Brown**. Thank you very much, Dr. Rosenberg.

You may proceed, Dr. Leveille.

Dr. **Leveille**. In view of the time, I will try to be very brief and present a very concise statement.

It is a pleasure to have the opportunity to testify here. As you pointed out earlier, Mr. Brown, I am currently employed as director of nutrition and health sciences for the General Foods Corp., and I am also president of the Institute of Food Technology, an organization of some 22,000 industry, academic, and government professionals interested in various aspects of food science and technology.

Also, in the past, it has been my privilege to serve some 15 years in academic research and administration in nutrition, and to have spent some 6 years in the Federal Government in nutrition research as well. So, hopefully, I can present some perspective which may be useful to this committee in terms of the need for planning at the Federal level.

I think there is an obvious degree of unanimity amongst the panelists, composing this present panel at least, for the need for a national plan. It is certainly unfortunate and regretable that, less than a year into the development of such a Federal plan, the Joint Subcommittee on Human Nutrition Research has been abolished. I was pleased to hear from Dr. Brandt, from Mr. Lyng, and from Dr. Bentley that a new initiative will replace that subcommittee. Certainly we all hope that that will be an effective and an appropriate effort. We will certainly await anxiously for the efforts of that committee and a plan which will emanate from it. Certainly I would hope that, as was the case with the previous effort, that the private sector will have an opportunity to participate in the development of that plan, for I feel that that is very crucial.

Basic research is certainly essential to the resolution of issues surrounding human nutrition. As one coming from the private sector, I would point to the real need in the private sector for fundamental research which emanates largely from academic research and from Federal research. That can then become the basis for the applied technology which American industry is so good at developing. But until we have a consensus among academic, public, and private sector scientists, a responsible food industry cannot be sure of how to provide products that will better help the consuming products to achieve improved nutrition.

I would point to the fortification issue as an example. Here the country has benefited from a coordinated Federal nutrition policy begun by the Government in the late thirties. Adoption of national fortification programs has effectively eliminated dietary deficiencies which used to be common in the United States.

Iodine, for example, has been added to salt to decrease the incidence of goiter. Milk fortified with vitamin D made rickets a rare disease, and niacin as an additive in bread and cereals has virtually eliminated pellagra.

Fortification, then, I believe, illustrates a situation where, based upon a scientific consensus on the function of vitamins and human nutrition, the Government was able to provide sound guidelines. The food processing industry, in turn, was able to develop new technologies in order to implement these Government policies.

Among the new frontiers of human nutrition research is a study of the potential relationship between diet and chronic disease. Here, a host of factors may be involved, including genetics, macronutrients—protein, fat, and carbohydrates, micronutrients—vitamins and minerals, intentional additives such as preservatives, flavors and colors, and substances unintentionally entering the food stream such as naturally occurring contaminants, microbially generated toxins, and environmental pollutants. The development of programs to help address these and other potential issues is essential in order for the food industry to design manufacturing technology to make food more healthful.

We know even less about new emerging issues surrounding the relationship of nutrition to behavior and people's sensitivity to foods which may cause adverse reactions.

These subcommittees have dealt with the need for nutrition surveillance programs in the past, and particularly the need to coordinate various Federal efforts into a single comprehensive program. This need remains urgent. An effective surveillance program is essential to identification of nutritional problems in the population and to guide research and intervention programs. Ultimately, the surveillance efforts must be a clearly identifiable part of a national nutrition research plan.

Before the food industry undertakes further development of products which will help address these new emerging issues, more research is certainly necessary. A consensus must be developed which can provide substantive guidelines and recommendations. For this to occur, not only do the universities and Government agencies need continued research support, but the country needs a unified, directed human nutrition research plan to identify and prioritize needed research and to provide estimates of manpower and budgetary needs to meet the stated objectives. Only then can we begin to deal with many of the questions that have been raised by these subcommittees this morning of funds needed and, probably more importantly, the reallocation of existing funds.

Thank you for your time.

[The prepared statement of Dr. Leveille follows:]

TESTIMONY -- BY G. A. LEVEILLE

PRESENTED BEFORE THE HOUSE SUBCOMMITTEE ON SCIENCE, RESEARCH AND TECHNOLOGY AND THE SUBCOMMITTEE ON DEPARTMENT OPERATIONS, RESEARCH AND FOREIGN AGRICULTURE

July 14, 1983

Good morning, my name is Gilbert A. Leveille. I am President of the Institute of Food Technology, an organization of 22 thousand industry, academic and government professionals interested in various aspects of food science and technology. I am also Director of Nutrition and Health Sciences for General Foods Corporation. Today, however, I am testifying on my own behalf.

It is an honor to be able to share my thoughts and perspectives with you on the role of the federal government in human nutrition research. In particular, I will focus on those areas in which there is potential for interaction between the public and private sectors.

To achieve the most from any public/private sector interaction, there must be a well developed and articulated national plan for human nutrition research. Unfortunately, although much progress has been made, we are still without such a plan.

A little over a year ago, on May 21, 1982, the Comptroller General of the United States issued his report entitled "Progress Made in Federal Human Nutrition Research Planning and Coordination: Some Improvements Needed."

This report acknowledged the excellent progress which had been made since 1978 in the coordination of federal human nutrition research activities by members of the Joint Subcommittee on Human Nutrition Research of the Federal Coordinating Council for Science, Engineering and Technology. This was under the lead of the Office of Science and Technology Policy (OSTP).

The Comptroller General's report encouraged the Director of OSTP to direct the development of a federal nutrition research plan comprising specific goals, objectives and strategies, identification of the responsibilities of the federal departments and agencies, and the required resources and time frames to accomplish the reserach goals. As a result of that recommendation, the Joint Subcommittee on Human Nutrition Research immediately set out to develop a braod federal nutrition plan within which the individual agencies could develop separate implementation plans consistent with their responsibilities. As the President's Science Advisor noted, such a plan would greatly enhance federal nutrition research programs.

It is, therefore, very regrettable that less than a year into the development of a comprehensive federal nutrition research plan, the Joint Subcommittee on Human Nutrition Research has been abolished.

More basic research is essential to the resolution of issues surrounding human nutrition. A coordinated federal nutrition research plan is the most efficient means of agetting at answers which in turn aid in the development of consensus. Until a consensus among academic, public and private sector scientists occurs, a responsible food industry cannot be sure how to provide products that will better help the consuming public to achieve improved nutriture.

Take the fortification issue as an example. Here the country has benefited from a coordinated federal nutrition policy. Begun by the government in the late 1930's, adoption of national fortification programs have effectively eliminated dietary deficiency diseases which used to be common in the United States.

Iodine, for example, has been added to salt to decrease the incidence of goiter. Milk fortified with vitamin D made rickets a rare disease, and niacin as an additive in bread and cereals helped to eliminate pellagra.

Fortification, then, illustrates a situation where, based upon a scientific consensus on the function of vitamins in human nutrition, the government was able to provide sound guidelines. The food processing industry then developed new technologies in order to implement these government policies.

Among the new frontiers of human nutrition research is the study of the potential relationship between diet and chronic disease. Here, a host of factors may be involved including genetics, macronutrients - protein, fat and carbohydrates, micronutrients - vitamins and minerals, intentional additives such as preservatives, flavors and colors, and substances unintentionally entering the food stream such as naturally occurring contaminants, microbially generated toxins and environmental pollutants. The development of programs to help address these and other potential issues is essential in order for the food industry to design manufacturing technology to make food more healthful.

We know even less about new, emerging issues surrounding the relationship of nutrition to behavior and peoples' sensitivity to foods which may cause adverse reactions.

You have dealt with the need for nutrition surveillance programs and particularly the need to coordinate various Federal efforts into a single comprehensive program. This need remains urgent. An effective surveillance program is essential to identification of nutritional problems in the population and to guide research and intervention programs. Ultimately, the surveillance efforts must be a clearly identifiable part of a national nutrition research plan.

Before the food industry undertakes further development of products which will help address these new emerging issues, more research is necessary. A consensus must be developed which can provide substantive guidelines and recommendations. For this to occur, not only do the universities and government agencies need continued research support, but the country needs a unified, directed human nutrition research program to identify and prioritize needed research and to provide estimates of manpower and budgetary needs to meet the stated objectives.

Thank you for your time.

Mr. BROWN. Thank you very much, Dr. Leveille.

You are not going to get fired for offering this testimony, are you?

Mr. LEVEILLE. I hope not.

Mr. BROWN. Dr. Hurt.

Dr. HURT. Thank you, Congressman Brown.

As a former trackman, I will do my best to run a fast lap on this relay so that we can get out of here by 1 o'clock.

I am the voluntary chairman of the National Nutrition Consortium. My other hat—which pays my paycheck—is the Quaker Oats Co., where I hold the position of director of nutrition. What I have to say today is my viewpoint based upon the actions of the board of directors of the National Nutrition Consortium and my own personal statement.

Thank you for the opportunity to present this testimony. Please read the written documents that have been submitted.

For your education and information, I think it is important that we bring you up to speed on the National Nutrition Consortium. This is an association of major scientific and nutrition professional societies, including the American Dietetic Association, the American Institute of Nutrition, the Institute of Food Technologists, Society for Nutrition Education, the American Association of Cereal Chemists, and the American College of Nutrition, which collectively represent approximately 80,000 professionals.

It is appropriate that I am the last person on this panel because much of what I said has already been said by my colleagues who are members of these organizations that the NNC represents. But I would like to include in my testimony two major parts. One, a recent statement developed and approved by our board of directors on the role of Federal Government in nutrition research programs and my personal viewpoints on the issues.

The NNC's statement on the role of the Federal Government in human nutrition research establishes nutrition research as our organization's No. 1 priority. The document reviews the past efforts of the Federal Government to define and coordinate nutrition research priorities. Based upon the review of this background information, the NNC board has made the following recommendations:

First, support and coordinate the research programs within the National Institutes of Health that emphasize nutrition. As part of this, the NNC urges that a center of nutrition be established within an existing institute to more directly focus support for basic nutrition research. This is a comment that Dr. Nesheim just made.

Second, maintain the USDA Human Nutrition Research Centers and the Human Nutrition Information Service programs that include surveys and, more importantly, the maintenance of a good, sound, solid mechanism for collecting nutrient composition of foods.

Third, strengthen the USDA competitive grants program so as to insure a viable applied nutrition research effort within the academic community.

Fourth, strengthen the support for food science related research within the USDA.

The NNC statement places special emphasis on the implementation of the HHS/USDA joint national nutrition monitoring system that, as you know, includes properly conducted food consumption surveys coupled with the maintenance of a complete data base for the composition of foods. This coordinated monitoring system, in our opinion, is necessary in order to evaluate the impact of the changing food supply, to identify essential areas in nutrition research that are related to the excesses of deficiencies of nutrients that may occur as a result of these changes, and in responding to food safety issues, such as food additive usages, exposure to potential carcinogens through food, and assisting in targeting effective food and nutrition education programs.

The USDA and DHHS, as you have heard today, certainly represent the main thrusts in Federal nutrition research programs. These organizations, in my opinion, emphasize normal nutrition and nutrition related to disease respectively. However, I feel that the minor nutrition research interests within other branches of the Federal Government would undoubtedly profit through continued effective coordination of all Federal nutrition research activities.

The issue of coordinating Federally supported nutrition research that has been discussed today is certainly of prime importance. I think it is important to recognize the science of nutrition, in order to make progress today, encompasses a very broad range of scientific disciplines which do have, in fact, an importance on human health and well-being.

Also recognize, too, that there are no simple problems related to nutrition and health out there, and the only way to make progress is to impact and exert a great deal of financial effort and personal manpower in order to clarify some of these very, very complicated problems related to nutrition. The easy problems were solved during the 1930's and 1940's and, in order to make any progress in the future, there must be a coordinated effort. In a single word, "coordination" must exist.

The mechanism of coordination, however, raises another question. We have heard some possible solutions to having a meaningful coordination within the Federal Government, and I certainly hope and I know the members of the NNC certainly will look forward to some sort of a satisfactory resolution of that issue.

Last year, Congressman Brown, you addressed the First Annual Conference on Federal Human Nutrition Research. As part of that testimony or that statement, you asked the question: What should the Nation's human nutrition research goals be, and what benefits to society could be realized by achieving these goals? I don't think we have heard answers to those questions today and, hopefully, coordinated efforts will provide those answers.

You also stated in that presentation that the academic and private sectors should be involved in the planning strategy of Federal nutrition research programs. The concept of a broadly based coalition of academic, industrial, and consumer opinions to assist in the development of national nutrition research goals and appropriate strategies is, indeed, sir, a laudable goal.

What can the organization that I am representing here today do about that, the National Nutrition Consortium, that does represent a large contingency of professionals involved in this area?

The NNC perspective on nutrition research can assist the Federal system in establishing goals and setting priorities, thereby avoiding duplication of effort and the development of contradictory recommendations that confuse people in your position rather than assist in the process. Because of the wide spectrum of professional interests and expertise in nutrition which is represented through the NNC membership, we have in place a mechanism to address a broad array of nutrition issues, evaluate the concerns from our perspective, identify the points where agreement can be reached, where there is disagreement, and develop appropriate rationale as to why there is disagreement.

Certainly such a plan developed through the efforts of a spectrum of professionals would help policymakers in developing the necessary mechanisms to advance the state of the art of nutrition and health and insure the sustained and continuous support for these programs in the best interest of the public.

In summary, may I say that progress in defining the explicit relationship between the food we eat, the nutrients provided by that food, and our overall health and well-being must be a coordinated effort, both from within the Federal agencies, as well as from among the various interests represented by consumers, industry, and professionals committed to food and nutrition issues.

These issues will continue to be an important concern of a number of unrelated Federal programs, as well as the academic community, which we have just heard from, and the private sector. Coordination of these interests at the Federal level, augmented by input from the public, private sector and the professional community, will help, in my opinion, to maximize efficiencies for the benefit of all concerned.

Thank you for this opportunity to appear before you, sir.

[The prepared statement of Dr. Hurt follows:]

NNC National Nutrition Consortium, Inc.

AMERICAN DIETETIC ASSOCIATION
AMERICAN INSTITUTE OF NUTRITION
AMERICAN SOCIETY FOR PARENTERAL
AND ENTERAL NUTRITION
INSTITUTE OF FOOD TECHNOLOGISTS
SOCIETY FOR NUTRITION EDUCATION

Liaison Organizations

AMERICAN ASSOCIATION OF CEREAL CHEMISTS
AMERICAN COLLEGE OF NUTRITION

Betty B. Blouin, M.S., R.D.
Executive Director

H. David Hurt, Ph.D. (IFT)
Quaker Oats Company
Chairman

Jerry Moore, Ph.D. (SNE)
Mead Johnson
Chairman-Elect

James R. Kirk, Ph.D. (IFT)
University of Florida
Secretary

Helen A. Guthrie, Ph.D. (AIN)
Pennsylvania State University
Treasurer

M. C. Nesheim, Ph.D. (AIN)
Cornell University
At-Large

1982-83 Board of Directors

Ronni Chernoff, Ed.M., R.D. (ASPEN)
University of Pennsylvania

Katherine Clancy, Ph.D., R.D. (SNE)
Syracuse University

Seymour L. Halpern, M.D. (ACN)
New York Medical College

Edna Langholz, R.D. (ADA)
President, Langholz Consulting, Inc.

Charlotte Roderuck, Ph.D. (AIN)
World Food Institute

Murray H. Seltzer, M.D. (ASPEN)
St. Barnabas Med. Center

Bruce R. Stillings, Ph.D. (AACC)
Nabisco, Inc.

Kathleen Zolber, Ph.D., R.D. (ADA)
Loma Linda University

TESTIMONY BY

H. DAVID HURT, PH.D., CHAIRMAN

NATIONAL NUTRITION CONSORTIUM, INC.

BEFORE THE

U.S. HOUSE OF REPRESENTATIVES

SUBCOMMITTEE ON SCIENCE, RESEARCH AND TECHNOLOGY

AND

SUBCOMMITTEE ON DEPARTMENT OPERATIONS, RESEARCH

AND FOREIGN AGRICULTURE

ON

"THE ROLE OF THE FEDERAL GOVERNMENT IN

HUMAN NUTRITION RESEARCH"

JULY 14, 1983

24 Third Street, N.E., Suite 200, Washington, D.C. 20002 • (202) 547-4819

NNC National Nutrition Consortium, Inc.

AMERICAN DIETETIC ASSOCIATION
AMERICAN INSTITUTE OF NUTRITION
AMERICAN SOCIETY FOR PARENTERAL
AND ENTERAL NUTRITION
INSTITUTE OF FOOD TECHNOLOGISTS
SOCIETY FOR NUTRITION EDUCATION

Liaison Organizations

AMERICAN ASSOCIATION OF CEREAL CHEMISTS
AMERICAN COLLEGE OF NUTRITION

H. David Hurt, Ph.D. (IFT)
Quaker Oats Company
Chairman

Betty B. [illegible], M.S., R.D.
Executive Director

I AM H. DAVID HURT, CHAIRMAN OF THE NATIONAL NUTRITION CONSORTIUM AND ON BEHALF OF THE BOARD OF DIRECTORS, I WOULD LIKE TO THANK YOU FOR THE OPPORTUNITY TO PRESENT TESTIMONY BEFORE THE U.S. HOUSE OF REPRESENTATIVES SUBCOMMITTEE ON SCIENCE, RESEARCH AND TECHNOLOGY AND THE SUBCOMMITTEE ON DEPARTMENT OPERATIONS, RESEARCH AND FOREIGN AGRICULTURE TODAY.

THE NATIONAL NUTRITION CONSORTIUM, A NON-PROFIT SCIENTIFIC AND EDUCATION ORGANIZATION, IS AN ASSOCIATION OF THE MAJOR SCIENTIFIC FOOD AND PROFESSIONAL SOCIETIES, INCLUDING THE AMERICAN DIETETIC ASSOCIATION, THE AMERICAN INSTITUTE OF NUTRITION, THE INSTITUTE OF FOOD TECHNOLOGISTS, SOCIETY FOR NUTRITION EDUCATION, THE AMERICAN ASSOCIATION OF CEREAL CHEMISTS, AND THE AMERICAN COLLEGE OF NUTRITION THAT REPRESENT APPROXIMATELY 80,000 MEMBERS.

THE OBJECTIVES OF THE NATIONAL NUTRITION CONSORTIUM ARE:

- FACILITATE INVOLVEMENT IN PUBLIC AFFAIRS CONCERNING ISSUES OF INTEREST TO THE FOOD AND NUTRITION PROFESSIONAL.
- FACILITATE COMMUNICATION AMONG THE FOOD AND NUTRITION PROFESSIONAL COMMUNITY.
- FACILITATE THE TRAINING OF FOOD AND NUTRITION STUDENTS IN PUBLIC POLICY AND GOVERNMENT ACTIVITIES.

[illegible] Third Street, N.E., Suite 200, Washington, D.C. 20002 • (202) 547-4819

THE NATIONAL NUTRITION CONSORTIUM HAS MADE HUMAN NUTRITION RESEARCH ITS HIGHEST PRIORITY AS NOTED IN THE ATTACHED BOARD STATEMENT. THE CONSORTIUM IS READY TO ASSIST CONGRESSIONAL COMMITTEES AND THE AGENCIES IN ANY WAY NECESSARY TO STRENGTHEN THE FEDERAL COMMITMENT TO HUMAN NUTRITION RESEARCH.

MY TESTIMONY TODAY WILL CONSIST OF TWO PARTS: (1) A RECENT STATEMENT DEVELOPED AND APPROVED BY THE NNC BOARD OF DIRECTORS ON THE ROLE OF FEDERAL GOVERNMENT IN HUMAN NUTRITION RESEARCH AND (2) MY PERSONAL VIEWS ON THE ISSUE BASED UPON EXPERIENCES WITH THE NNC MEMBER ORGANIZATIONS, GOVERNMENT AGENCIES AND THE ACADEMIC NUTRITION COMMUNITY.

THE NNC STATEMENT ON THE ROLE OF THE FEDERAL GOVERNMENT IN HUMAN NUTRITION RESEARCH ESTABLISHES NUTRITION RESEARCH AS OUR NUMBER ONE PRIORITY. THE DOCUMENT REVIEWS THE PAST EFFORTS OF THE FEDERAL GOVERNMENT TO DEFINE AND COORDINATE NUTRITION RESEARCH PRIORITIES. THE NNC BOARD OF DIRECTORS MAKE THE FOLLOWING RECOMMENDATIONS:

1) SUPPORT AND COORDINATE THE RESEARCH PROGRAMS WITHIN THE NATIONAL INSTITUTES OF HEALTH THAT EMPHASIZE NUTRITION. AS PART OF THIS THE NNC URGES THAT A CENTER FOR NUTRITION BE ESTABLISHED WITHIN AN EXISTING INSTITUTE TO FOCUS SUPPORT FOR BASIC NUTRITION RESEARCH.
2) MAINTAIN THE USDA HUMAN NUTRITION RESEARCH CENTERS AND THE HUMAN NUTRITION INFORMATION SERVICE PROGRAMS (HNIS).

3) STRENGTHEN THE USDA COMPETITIVE GRANTS PROGRAM SO AS TO ENSURE A VIABLE APPLIED NUTRITION RESEARCH EFFORT WITHIN THE ACADEMIC COMMUNITY.

4) STRENGTHEN THE SUPPORT FOR FOOD SCIENCE RELATED RESEARCH WITHIN THE USDA.

THE NNC STATEMENT PLACES SPECIAL EMPHASIS ON THE IMPLEMENTATION OF THE HHS/USDA JOINT NATIONAL NUTRITION MONITORING SYSTEM AND THE IMMEDIATE NEED TO MAINTAIN CONTINUITY IN ITS ABILITY TO EVALUATE THE NUTRITION AND HEALTH STATUS OF THE POPULATION. A COORDINATED NUTRITION MONITORING SYSTEM WOULD BE OF VALUE IN IDENTIFYING POTENTIAL AREAS OF NUTRITION RESEARCH RELATED TO NUTRITIONAL EXCESSES OR DEFICIENCIES; IN RESPONDING TO FOOD SAFETY CONCERNS SUCH AS FOOD ADDITIVE USAGE AND EXPOSURE TO POTENTIAL CARCINOGENS THROUGH FOOD; AND IN ASSISTING TO TARGET EFFECTIVE FOOD AND NUTRITION EDUCATION PROGRAMS.

THE USDA AND DHHS REPRESENT THE MAIN THRUSTS IN FEDERAL NUTRITION RESEARCH PROGRAMS WITH RESPECTIVE EMPHASIS ON NORMAL NUTRITION AND NUTRITION AND DISEASE. THE MINOR NUTRITION RESEARCH INTERESTS WITHIN THE OTHER BRANCHES OF THE FEDERAL GOVERNMENT WILL PROFIT THROUGH EFFECTIVE COORDINATION OF ALL FEDERAL NUTRITION RESEARCH ACTIVITIES.

THE ISSUE OF COORDINATING FEDERALLY SUPPORTED NUTRITION RESEARCH, BEING DISCUSSED TODAY, IS OF PRIME IMPORTANCE. NUTRITION RESEARCH IS BROAD AND COVERS A WIDE SPECTRUM OF SUBJECTS (I.E. NUTRIENTS FOUND IN VARIOUS FOOD PRODUCTS TO NUTRITION FOR CANCER PATIENTS). IT IS CLEAR THAT MANY

GOVERNMENT AGENCIES HAVE VESTED INTERESTS IN SOME OF THE SAME RESEARCH AREAS. THUS, COORDINATION MUST EXIST.

THE MECHANISM OF COORDINATION RAISES ANOTHER ISSUE. HOW CAN COORDINATION BE BEST FACILITATED? IN LIGHT OF THE RECENT TERMINATION OF THE JOINT SUBCOMMITTEE ON HUMAN NUTRITION RESEARCH, SOME PLAN IS NECESSARY AND WE LOOK FORWARD TO THE IMPLEMENTATION OF COORDINATION PLANS BY REPRESENTATIVES OF USDA AND DHHS.

EVEN BEFORE COORDINATION, AGENCIES MUST ESTABLISH THEIR NUTRITION RESEARCH GOALS AND PRIORITIES. CONGRESSMAN BROWN RAISED THE ISSUE OF GOALS AT THE JOINT SUBCOMMITTEE ON HUMAN NUTRITION RESEARCH MEETING ON DECEMBER 16 WITH HIS QUESTION:

> "WHAT SHOULD THE NATION'S HUMAN NUTRITION RESEARCH GOALS BE AND WHAT BENEFITS TO SOCIETY COULD BE REALIZED BY ACHIEVING THESE GOALS?"

CONGRESSMAN BROWN FURTHER STATED THAT THE ACADEMIC AND PRIVATE SECTOR SHOULD BE INVOLVED IN THE PLANNING STRATEGY FOR FEDERAL NUTRITION RESEARCH PROGRAMS. THE CONCEPT OF A BROADLY BASED COALITION OF ACADEMIC, INDUSTRIAL AND CONSUMER OPINIONS TO ASSIST IN THE DEVELOPMENT OF NATIONAL NUTRITION RESEARCH GOALS AND APPROPRIATE STRATEGIES IS INDEED A LAUDABLE CONCEPT.

THE NNC PERSPECTIVE ON NUTRITION RESEARCH ISSUES CAN GREATLY ASSIST THE FEDERAL SYSTEM IN ESTABLISHING GOALS AND SETTING PRIORITIES THEREBY AVOIDING DUPLICATION OF EFFORT AND DEVELOPMENT OF CONTRADICTORY RECOMMENDATIONS THAT WILL CONFUSE RATHER THAN ASSIST THE PROCESS. BECAUSE OF THE WIDE SPECTRUM OF PROFESSIONAL INTERESTS AND EXPERTISE IN NUTRITION WHICH IS REPRESENTED THROUGH NNC MEMBERSHIP, WE HAVE IN PLACE A MECHANISM TO ADDRESS A BROAD ARRAY OF NUTRITION ISSUES, EVALUATE THE CONCERNS FROM OUR PERSPECTIVE MEMBERSHIP, IDENTIFY THE POINTS WHERE AGREEMENT EXISTS, WHERE THERE IS DISAGREEMENT, AND DEVELOP RATIONALE AS TO WHY THERE IS DISAGREEMENT.

CERTAINLY SUCH A PLAN DEVELOPED THROUGH THE EFFORTS OF A SPECTRUM OF PROFESSIONALS WOULD GREATLY ASSIST POLICY-MAKERS IN DEVELOPING THE NECESSARY MECHANISMS TO ADVANCE THE STATE-OF-THE-ART IN NUTRITION AND HEALTH; AND ENSURE THE SUSTAINED AND CONTINUOUS SUPPORT FOR THESE PROGRAMS IN THE BEST INTEREST OF THE PUBLIC.

IN SUMMARY, PROGRESS IN DEFINING THE EXPLICIT RELATIONSHIP BETWEEN THE FOOD WE EAT, THE NUTRIENTS PROVIDED BY THAT FOOD, AND OUR OVERALL HEALTH AND WELL BEING MUST BE A COORDINATED EFFORT BOTH FROM WITHIN THE FEDERAL AGENCIES AS WELL AS FROM AMONG THE VARIOUS INTERESTS REPRESENTED BY CONSUMERS, INDUSTRY, AND PROFESSIONALS COMMITTED TO FOOD AND NUTRITION ISSUES.

FOOD AND NUTRITION ISSUES WILL CONTINUE TO BE AN IMPORTANT CONCERN OF A NUMBER OF UNRELATED FEDERAL PROGRAMS. COORDINATION OF THESE INTERESTS AT THE FEDERAL LEVEL AUGMENTED BY INPUT FROM THE PUBLIC, PRIVATE SECTOR AND THE PROFESSIONAL COMMUNITY WILL HELP TO MAXIMIZE EFFICIENCIES FOR THE BENEFIT OF ALL CONCERNED. THANK YOU FOR THIS OPPORTUNITY TO APPEAR BEFORE THIS JOINT SUBCOMMITTEE.

RESUME

H. DAVID HURT

Chairperson, National Nutrition Consortium
24 Third Street, N.E.
Washington, DC 20002

Present Position:	Director of Nutrition The Quaker Oats Company

Previous Experience:

1976-79	Associate Director of Nutrition, Del Monte Corporation
1972-76	Division Head, Nutrition, Campbell Soup Co.
	Assistant Director, Nutrition Research
1969-72	National Dairy Council

Education:	Ph.D., Nutrition	Cornell University
	M.S., Nutrition	University of Connecticut
	B.S., Nutrition	Colorado State University

Professional Affiliations:

1978-83 IFT Board Representative to National Nutrition Consortium

Member:	American Institute of Nutrition Institute of Food Technologists American Dietetic Association Society for Nutrition Education

nnc

National Nutrition Consortium, Inc.

AMERICAN DIETETIC ASSOCIATION
AMERICAN INSTITUTE OF NUTRITION
AMERICAN SOCIETY FOR PARENTERAL
AND ENTERAL NUTRITION
INSTITUTE OF FOOD TECHNOLOGISTS
SOCIETY FOR NUTRITION EDUCATION

Liaison Organizations

AMERICAN ASSOCIATION OF CEREAL CHEMISTS
AMERICAN COLLEGE OF NUTRITION

Betty B. Blouin, M.S., R.D.
Executive Director

H. David Hurt, Ph.D. (IFT)
Quaker Oats Company
Chairman

Jerry Hoene, Ph.D. (SNE)
Mead Johnson
Chairman-Elect

James R. Kirk, Ph.D. (IFT)
University of Florida
Secretary

Helen A. Guthrie, Ph.D. (AIN)
Pennsylvania State University
Treasurer

M. C. Nesheim, Ph.D. (AIN)
Cornell University
At-Large

1982-83 Board of Directors

Ronni Chernoff, Ed.M., R.D. (ASPEN)
University of Pennsylvania

Katherine Clancy, Ph.D., R.D. (SNE)
Syracuse University

Seymour L. Halpern, M.D. (ACN)
New York Medical College

Edna Langholz, R.D. (ADA)
President, Langholz Consulting, Inc.

Charlotte Roderuck, Ph.D. (AIN)
World Food Institute

Murray H. Seltzer, M.D. (ASPEN)
St. Barnabas Med. Center

Bruce R. Stillings, Ph.D. (AACC)
Nabisco, Inc.

Kathleen Zolber, Ph.D., R.D. (ADA)
Loma Linda University

NNC POLICY STATEMENT
ON
HUMAN NUTRITION RESEARCH

Approved by the NNC Board of
Directors

June 10, 1983

24 Third Street, N.E., Suite 200, Washington, D.C. 20002 • (202) 547-4819

The National Nutrition Consortium, a non-profit scientific and education organization, is an association of the major scientific food and professional societies, including the American Dietetic Association, the American Institute of Nutrition, the Institute of Food Technologists, Society for Nutrition Education, the American Association of Cereal Chemists, and the American College of Nutrition that represent approximately 80,000 members.

The objectives of the National Nutrition Consortium are:

- Facilitate involvement in public affairs concerning issues of interest to the food and nutrition professional.
- Facilitate communication among the food and nutrition professional community.
- Facilitate the training of food and nutrition students in public policy and government activities.

The National Nutrition Consortium has made human nutrition research its highest priority and beyond the preparation of this document is ready to assist Congressional committees and the agencies in any way necessary to strengthen the Federal commitment to human nutrition research.

The following statement, prepared by the National Nutrition Consortium, speaks to its concerns regarding the Federal government's continued support of human nutrition research. Contained herein are several priority areas including an iteration of immediate concern regarding the importance of the Nutrition Monitoring and Surveillance System.

NUTRITION RESEARCH: A CONTINUING PRIORITY

The last decade has witnessed substantial growth in the support for and recognition of nutrition as a component of human health. Federal support for human nutrition research has been strengthened, particularly through special initiatives in the National Institutes of Health, i.e. Diet, Nutrition and Cancer program, ongoing studies of the relationship of diet to cardiovascular disease and establishment of Clinical Nutrition Research Units. The USDA commitment to Human Nutrition Research has been expanded by establishment of the competitive grants program and the Human Nutrition Research Centers (i.e. Tufts, Baylor, San Francisco, Grand Forks and Beltsville). These Centers have increased research on the nutritional aspects of aging, child health, trace elements and surveillance.

Concern for the needs and the direction of federal human nutrition research led to several analyses of human nutrition research priorities in the late 1970's. The General Accounting Office (GAO) and the Office of Science and Technology Policy (OSTP) issued comprehensive reports on research priorities in late 1977 followed shortly by a report from the Office of Technology Assessment (OTA) in 1980. The Joint Subcommittee on Human Nutrition Research (JSHNR) published a report dealing with human nutrition research and training primarily with domestic issues and followed a comprehensive World Food Study carried out by the National Academy of Sciences (NAS) in 1976 which defined nutrition research priorities on an international scale.

These studies all identified several broad research areas as major priorities for nutrition research funding. They included:

1. Role of diet in the development and prevention of chronic disease and obesity. (GAO 1977, OSTP 1977, OTA 1978, JSHNR 1980).

2. Further definition and establishment of human nutrient requirements (NAS 1976, GAO 1977, OTA 1978, JSHNR 1980).

3. Nutrition education theory and methodology for various population groups (NAS 1976, OSTP 1977, OTA 1978, JSHNR 1980).

4. Improved methodology for nutritional surveillance (monitoring nutritional status, evaluating nutrition programs) (NAS 1976, GAO 1977, 1980, 1982, OSTP 1977, OTA 1978, JSHNR 1980).

5. Several aspects of food science, particularly food safety, food fortification, nutrient availability and food composition (NAS 1976, OSTP 1977, GAO 1978, OTA 1978, JSHNR 1980).

Substantial research has been carried out since these reports were issued but much remains to be done. Today's nutrition research priorities have not greatly changed (American Journal of Clinical Nutrition - May 1982) but support for some of these areas has declined. The Nutrition Consortium is particularly concerned about reallocation in funding to support the implementation of the Joint National Nutrition Monitoring System as proposed in the 1984 Federal Budget.

The National Nutrition Monitoring System, a joint effort of USDA and HHS, provides basic information on the health and nutritional status of the U.S. population. The National Food Consumption Survey, USDA and the Health and Nutrition Examination Surveys provide a comprehensive picture of food consumption practices and nutritional well being of the U.S. population. These basic surveys also provide the major data base by which long term relationships between food practices and health can be examined. Thus, they provide a basic epidemiological tool to examine the health and nutrition relationships. The NNC would support legislative initiatives that would insure the implementation of the HHS/USDA joint plan so that the long term planning and implementation of the Monitoring System can proceed.

We recognize that in this period of budgetary stringency many national priorities must compete for federal funds. However, based on the benefits to human health, we urge that the ongoing support for nutrition research by the Federal government be continued and strengthened. In particular, the Federal Government, through the Executive department and by Congressional support is urged to:

1. Provide continued support of the research related to nutrition carried out by the National Institutes of Health. Although nutrition plays a role in the mission of each of the NIH Institutes, the Nutrition Consortium urges that a Center for Nutrition be established within an existing institute to focus support for basic nutrition research.

2. Maintain the Human Nutrition Research Centers and Human Nutrition Information Service (HNIS) within the USDA so that long term programs can be continued in nutrition research priority areas.

3. Strengthen the competitive grants program of the USDA to ensure high quality research and a continued emphasis on the USDA mission in human nutrition.

4. Continue and strengthen support to food science related research.

The NNC recognizes the gains in awareness of the importance of human nutrition to the health and well being of the American people that have occurred within the past 10 years. We are concerned, however, that nutrition remains a national goal and that research needs receive continued support as budgetary priorities are established. Certainly insuring a healthy, well nourished people must continue to be a national priority.

nnc

National Nutrition Consortium, Inc.

JUNE 1982 – 1983 REPORT

FORMER NNC CHAIRPERSONS

D. Mark Hegsted, Ph.D. (AIN)
President, 1973-74
Harvard University

Herbert E. Robinson, Ph.D. (IFT)
President, 1974-75
Consultant

David B. Coursin, M.D. (ASCN)
President,1975-76
St. Joseph Hospital, Lancaster

Isabelle Hallahan, R.D. (ADA)
President, 1976-77
Consultant

George K. Davis, Ph.D. (AIN)
President, 1977-78
University of Florida

Gilbert A. Leveille, Ph.D. (IFT)
President, 1978-79
Michigan State University

Robert E. Olson, M.D. (ASCN)
President, 1979-80
St. Louis University of Medicine

Marjorie Devine, Ph.D., (SNE)
President, 1980-81
Cornell University

M. C. Nesheim, Ph.D. (AIN)
President, 1981-82
Cornell University

NNC FOUNDERS

John G. Bieri, Ph.D. (AIN)
National Institute of Health

Benjamin F. Buchanan, Ph.D. (IFT)
General Foods Corporation

C. Edward Butterworth, Ph.D. (ASCN)
University of Alabama Medical Center

Clinton O. Chichester, Ph.D. (IFT)
Nutrition Foundation

David B. Coursin, M.D. (ASCN)
St. Joseph Hospital, Lancaster

William J. Darby, M.D. (ASCN)
Nutrition Foundation

Harry G. Day, Ph.D. (AIN)
Indiana University

Frances Fisher, R.D. (ADA)
Case Western Reserve

Annie L. Galbraith, R.D. (ADA)
Massachusetts General Hospital

Stanley N. Gershoff, Ph.D. (AIN)
Harvard University

Grace A. Goldsmith, M.D. (ASCN)
Tulane University

Willis A. Gortner, Ph.D. (IFT)
USDA

Isabelle Hallahan, R.D. (ADA)
Consultant

Alfred E. Harper, Ph.D. (AIN)
University of Wisconsin

D. Mark Hegsted, Ph.D. (AIN)
Harvard University

O. Lee Kline, Ph.D. (AIN)
American Institute of Nutrition

Katherine Manchester, R.D. (ADA)
Colonel, U.S. Army (Ret.)

Reid T. Milner, Ph.D. (IFT)
University of Illinois

Herbert E. Robinson, Ph.D. (IFT)
Consultant

Harold H. Sandstead, M.D. (ASCN)
USDA

Richard M. Stalvey (Nutrition Foundation)
Nutrition Foundation

Theodore B. Van Itallie, Ph.D. (ASCN)
Columbia University College of Physicians and Surgeons

Philip L. White, D.Sc. (SNE)
American Medical Association

Arlene M. Wilson, R.D. (ADA)
Indiana University Medical Center

NNC
National Nutrition Consortium, Inc.

AMERICAN DIETETIC ASSOCIATION
AMERICAN INSTITUTE OF NUTRITION
AMERICAN SOCIETY FOR PARENTERAL
AND ENTERAL NUTRITION
INSTITUTE OF FOOD TECHNOLOGISTS
SOCIETY FOR NUTRITION EDUCATION

Liaison Organizations

AMERICAN ASSOCIATION OF CEREAL CHEMISTS
AMERICAN COLLEGE OF NUTRITION

Betty B. Blouin, M.S., R.D.
Executive Director

H. David Hurt, Ph.D. (IFT)
Quaker Oats Company
Chairman

Jerry Moore, Ph.D. (SNE)
Mead Johnson
Chairman-Elect

James R. Kirk, Ph.D. (IFT)
University of Florida
Secretary

Helen A. Guthrie, Ph.D (AIN)
Pennsylvania State University
Treasurer

M. C. Nesheim, Ph.D. (AIN)
Cornell University
At-Large

1982-83 Board of Directors

Ronni Chernoff, Ed.M., R.D. (ASPEN)
University of Pennsylvania

Janet Tenney, M.S., R.D., (SNE)
Giant Foods, Inc.

Seymour L. Halpern, M.D. (ACN)
New York Medical College

Edna Langholz, R.D. (ADA)
President, Langholz Consultants, Inc.

Charlotte Roderuck, Ph.D. (AIN)
World Food Institute

Murray H. Seltzer, M.D. (ASPEN)
St. Barnabas Med. Center

Bruce R. Stillings, Ph.D. (AACC)
Nabisco, Inc.

Kathleen Zolber, Ph.D., R.D. (ADA)
Loma Linda University

Dear Friends and Colleagues:

Food and nutrition issues continue to impact on regulatory and legislative activities concerned with human health and well-being. Given the increased public awareness of the relationship between diet and health, policymakers have become increasingly dependent upon the professional community for input in making informed decisions. Because of the complexity of the many facets of food, nutrition, and health the interests and viewpoints of the scientist, dietitian, physician, and educator, priorities are varied. As a result, single interests without coordination tend to confuse rather than direct policy issues.

The National Nutrition Consortium was created to serve the professional food and nutrition community by providing a hub around which public policy interests and activities are shared and coordinated. Information pertaining to important issues from within each of the member organizations, as well as from outside sources, is exchanged. The Consortium provides a mechanism whereby the divergent viewpoints on food and nutrition issues of the professional community are presented and discussed, points of agreement established, and points of divergence identified and defined. These coordinated positions are then shared with policymakers aiding them in establishing appropriate strategies.

This document will acquaint you with the structure and programs of the National Nutrition Consortium. We invite you to use it as a resource and guide to the food and nutrition professional community.

H. David Hurt
H. David Hurt
Chairperson

Betty B. Blouin
Betty B. Blouin
Executive Director

24 Third Street, N.E., Suite 200, Washington, D.C. 20002 • (202) 547-6819

What You Should Know About the National Nutrition Consortium, Inc. – A Brief History

The public and their representatives in Federal and State legislatures have become more interested in nutrition during the last decade. Much of the information they have received has been from persons with little or no training in disciplines related to foods and nutrition. In this regard there was (and continues to be) a critical need for accurate presentation of nutrition facts and involvement in the application of nutrition science in public policy decisions by persons who are qualified by training and experience.

It was to meet this critical public need and to facilitate communication among professional nutritionists that the four societies representing dietitians, basic research, medical research and food science and technology formed the National Nutrition Consortium in 1973. The professional organization representing nutrition educators joined the Consortium in 1977.

The Consortium is classified by the Internal Revenue Service as a 501(c)(3) organization. The Consortium strives to provide nutrition information to the public policy maker by responding to requests from Congress and its research arms (Office of Technology Assessment and Government Accounting Office). The Consortium also cooperates with executive departments such as the Department of Agriculture and Department of Health and Human Services, and independent agencies such as the Federal Trade Commission.

The Consortium has been addressing problems of nutrition education, food quality and safety, National Nutrition Policy and its implementation, and nutrition research priorities and support. Increasingly, the Consortium has provided a ready coordinated resource of nutrition expertise to the executive and legislative arms of the Federal government.

> *"The National Nutrition Consortium represents the collective voice of the most respected scientific and professional societies concerned with food and nutrition. These organizations constitute a scientific and professional constituency of some 80,000 members. The Consortium has potential for extraordinarily effective educational activities that can considerably complement the work of the Nutrition Foundation and of other prestigious competent nutrition groups, especially within the Washington scene."*

Dr. William J. Darby

Objectives

The National Nutrition Consortium, a non-profit scientific and education organization, is an association of the major scientific food and nutrition professional societies representing approximately 80,000 members.

The objectives of the National Nutrition Consortium are:

- Facilitate involvement in public affairs concerning issues of interest to the food and nutrition professional.
- Facilitate communication among the food and nutrition professional community.
- Facilitate the training of food and nutrition students in public policy and government activities.

In order to achieve these objectives, the Consortium has prepared testimony and background documents on public policy issues, published position papers on controversial nutrition and food policy issues, and offered the scientific community insights into public policy through summaries of pending legislation, proposed regulations, and federal documents related to food and nutrition. It has also served as a clearinghouse for information on food and nutrition for public policy makers, organized symposia and seminars for the discussion of public policy issues related to nutrition, and has provided policy makers and their staff rapid access to the various services of its member organizations.

Programs of the National Nutrition Consortium are carried out by three bodies: Standing Committees, Issue Committees, and the Washington-based staff. The Standing Committee, Public Affairs, has broad responsibilities for monitoring issues, developing statements, and recommending actions to the Board of Directors. The Issue Committees are formed to prepare positions and recommendations on specific issues, and are decommissioned when their final reports are accepted by the Board of Directors.

All Committees are responsible for:

1. Identification of discrete issues, options, and decision points within their issue area,
2. Drafting position papers, testimony, or other documents for approval by the Board of Directors and presentation in the appropriate legislative or regulatory forum, and
3. Responding to requests for input from public policy makers, both from Congress and regulatory or other executive agencies.

The details of the 1982 NNC programs and accomplishments are described in the subsequent pages.

Programs/Activities	Accomplishment
• **Public Policy**	NNC, through its Issue Committee, has developed position papers and statements on a variety of topics of importance to the food and nutrition scientific community. These papers are based on the latest sound and factual information available. These issues represent the collective position of the NNC professional societies. During 1982 the following issues were identified by the NNC Board as being important: Health Manpower, Food Labeling, Dietary Recommendations, Food Fortification, and Food Safety. HHS and USDA requested the Consortium's expertise regarding several important issues (e.g.) carbohydrate chemistry and food safety. The Wheat Industry Council (USDA) requested from the Consortium its assistance in providing members to serve on its Consumer Panel. One representative from each member society was selected by USDA to serve. The NNC provided prompt response to legislative staff regarding the importance of having a strong national nutrition monitoring system. Presently the NNC is developing a position statement to support this initiative.
• **Nutrition Alerts**	Nutrition Alerts are up-to-date informative bulletins concerning legislative and/or regulatory matters of importance to the food and nutrition community. Fifteen Nutrition Alerts on various significant issues were published by the Consortium during 1982. Currently, there are over 300 subscribers to these Nutrition Alerts.
• **Public Affairs Update**	Through its Public Affairs activities, NNC keeps its member organizations updated on matters of interest and importance to their membership. The information is provided by NNC through the Public Affairs column (written 4 per year) as well as Public Affairs Updates/Seminars held at the annual meetings of member organizations.
• **Health Fairs**	The activity is directed toward providing nutrition information as part of health awareness programs for legislative and agency staff members. These highly successful activities have provided nutrition information about the "health" of people using computerized nutrient data bases. This innovative program was instituted in the 3rd quarter of 1982 and effectively carried out with employees of HHS, GAO and DOE. NNC plans to carry out more of these health fairs with the U.S. Senate and House of Representatives during early 1983.

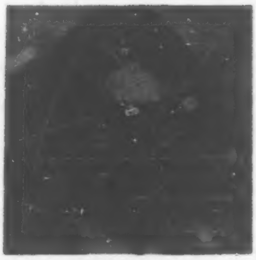
Programs/Activities	Accomplishment
• **Fellowship/Sabbatical**	This highly effective on-going program provides graduate students and faculty members first hand insight into the food and nutrition policy making process by offering an opportunity to work with trade associations, Congress and Federal agencies in matters of policy development. The program is implemented in Washington, D.C. under NNC direction. To date 13 graduate student participants have successfully completed this program. Dr. Robert Van Reen, University of Hawaii has recently initiated his sabbatical program to carry out a research project concerning nutrition research funding at land grant universities.
• **Nutrition Policy Seminar**	NNC sponsors an annual 3 day seminar program in Washington, D.C. directed toward graduate students with an intent of providing first hand exposure to the personalities and programs of the legislative and regulatory agencies concerning subjects of interest to the young student in dietetics, food science, nutrition and/or public health. The 5th annual seminar will be held in April 1983.
• **Publications of Interest**	NNC continues to publish materials in a number of areas — nutrition and aging, sodium labeling, and Food, Nutrition and Your Government, etc. The latter will describe the food and nutrition programs within the Federal system such as key agencies, committees and staff.
• **Nutrition Research**	This is a new NNC program aimed at defining for the legislative staff key important research areas in food and nutrition. This long term research need of the scientific nutrition community has already been of invaluable assistance to policy makers in developing sound legislative action.

Additional information concerning any of the activities cited above can be obtained from the NNC office.

JUNE 1982-1983

Board of Directors

H. David Hurt, Ph.D. (IFT)
NNC Chairperson
Director of Nutrition
Quaker Oats



Jerry Moore, Ph.D. (SNE)
NNC Chairperson-Elect
Mead Johnson

Malden C. Nesheim, Ph.D. (AIN)
NNC Member-At-Large
Director, Division of Nutritional Sciences
Cornell University

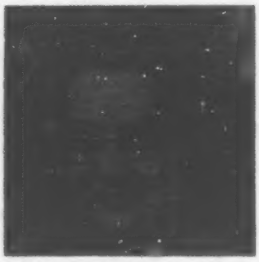
Helen A. Guthrie, Ph.D. (AIN)
NNC Treasurer
Pennsylvania State University

Kathleen Zolber, Ph.D., R.D. (ADA)
NNC Executive Committee Member
Professor and Director, Dietetics
School of Allied Health
Loma Linda University

James R. Kirk, Ph.D. (IFT)
NNC Secretary
Professor and Chairman
Department of Food Science and Human Nutrition
University of Florida

Ronni Chernoff, Ed.M., R.D. (ASPEN)
Clinical Oncology Research Nutritionist
University of Pennsylvania

Murray H. Seltser, M.D. (ASPEN)
Director, Nutrition Support Service
Clinical Associate Professor of Surgery
New Jersey College of Medicine and Dentistry



Charlotte Roderuck, Ph.D. (AIN)
Director, World Food Institute
Iowa State University

Edna Langholz, R.D. (ADA)
President
Langholz Consultants, Inc.

Seymour L. Halpern, M.D., FACP, FACN, (ACN)
Assistant Clinical Professor of Medicine
New York Medical College
Attending Physician in Medicine Nutrition and Metabolism
Cabrini Medical Center

Bruce R. Stillings, Ph.D. (AACC)
Director of Research
Nabisco

Janet Tenney, M.S., R.D. (SNE)
Nutritionist
Giant Foods, Inc.

Betty B. Blouin, M.S., R.D.

Executive Director

Betty B. Blouin, Executive Director, joined the Consortium in March 1982 and brings to this position a unique background vital to the coordination and legislative functions of the Consortium. She served in the capacity of NNC Chairman of the Public Affairs Committee from 1980 to 1982 and Co-Chairman since 1978. In addition, she is a member of ADA, ASPEN and IFT.

From 1976 through 1980, Mrs. Blouin was the Washington Liaison and registered lobbyist for the American Dietetic Association. She maintained relationships with interest groups and professional associations concerned with nutrition and health. During this period of time, she also chaired the Women's Joint Congressional Committee.

Mrs. Blouin holds a B.S. degree in Institutional Management, College of Home Economics, Louisiana Tech University and completed a Dietetic Internship at Brooke General Hospital, Ft. Sam Houston, Texas. In 1980, she received a Master of Science Degree, from the College of Public and International Affairs, American University and was initiated into Phi Kappa Phi.

STANDING COMMITTEES

Public Affairs Committee

The Public Affairs Committee, chaired by Mahlon Burnette, III, Ph.D. (AACC) is composed of Washington-based members of each society. The committee members, already active in the public policy area, serve as both extensions of, and advisers to, the Consortium staff on all aspects of public affairs. The committee recommends actions, reviews Consortium reports, and analyzes the public policy arena for the Board of Directors. The committee is also a primary source of public policy intelligence, which serves as a guide to the Issue Committees and as the basis for many Nutrition Alert publications. Members of the committee include Sam R. Hoover, Ph.D. (IFT); Karen Knight-McMullen (ASPEN); Gilda Knight (ASCN); Russell M. Jaffe, M.D. (ACN); Lenora Moragne, Ph.D. (ADA); and Catherine Woteki, Ph.D. (SNE).

Fund Raising Committee

The National Nutrition Consortium receives financial support from a variety of sources: the societies, individual scientists, physicians, dietitians, and educators. Private foundations and corporate contributors provide the major share of the program revenues. In addition, honoraria and royalties have been consigned to the Consortium, and the sale of Consortium publications help offset the costs of printing and mailing. The primary task of seeking industry and foundation support for the Consortium falls on the Fund Raising Committee: Andre Bolaffi, Ph.D., Chairman (IFT); Ben F. Buchanan, Ph.D. (IFT); Marjorie Devine, Ph.D. (SNE); Helen A. Guthrie, Ph.D. (AIN); David Hurt, Ph.D. (IFT); Gilbert A. Leveille, Ph.D. (IFT); Mal C. Nesheim, Ph.D. (AIN); and Bruce R. Stillings, Ph.D. (AACC).

ISSUE COMMITTEES

Dietary Recommendations, chaired by Dr. Robert E. Shank, M.D. (AIN), is charged with surveying the dietary recommendations which have been made to the public over the past forty years, identifying areas of agreement and disagreement among scientists, and explaining why the disagreements exist. Members include Carolyn Lackey, Ph.D. (IFT); Janet Schwartz, Ph.D. (SNE); Marilyn Farrand, R.D. (ADA); and William Steffee, M.D., Ph.D. (ASPEN).

Food Labeling, chaired by Carole Bisogni, Ph.D. (SNE), is charged with recommending positions on all issues of food labels and labeling, monitoring development of public policy on these issues, and reporting on the impact of tools such as food labels in the consumer's decision-making. Members include Isabel Wolf, Ph.D. (IFT); George Vahouny, Ph.D. (ASCN); Bonita Wyse, Ph.D. (ADA); Richard Jansen, Ph.D. (AIN); Alta Engstrom, R.D. (ADA); and W. Robert Rout, M.D. (ASPEN).

Food Fortification, chaired by Klaus Lorenz, Ph.D. (IFT), is charged with surveying existing reports and proposals on food fortification, identifying areas of agreement and disagreement among scientists, and explaining why the disagreements exist. They will also draft a food fortification statement, and outline areas of responsibility for the food industry, the government, and the consumer in the fortification of food. Members include Robert Nesheim, Ph.D. (AIN); Mary Bess Kohrs, Ph.D., R.D. (ASCN); Margaret Phillips, M.S., J.D. (SNE); Elaine Monsen, Ph.D., R.D. (ADA); and Johanna Roth, R.D. (ASPEN).

Food Safety, is currently being formed. It will be charged with monitoring legislative and regulatory actions which impact on Food Safety developing position papers on these actions, and reporting on the effect of such actions on the scientific community represented by the members of the Consortium.

Health Manpower. chaired by Joan Sharp, R.D. (ADA), is charged with monitoring the development of legislative or regulatory actions which impact on health profession training, education, or participation in government programs. The committee will also recommend positions on such issues, and draft reports assessing the impact on the food or nutrition professional of any such actions. Members include John Anderson, M.D. (AIN); William Marion, Ph.D. (IFT); Jo Anne Brasel, M.D. (ASCN); Jean Hankin, R.D., Dr.P.H. (At-Large); and Howard Jacobson, M.D. (SNE).

Nutrition Research, chaired by M. C. Nesheim, Ph.D. (AIN) is charged with developing a coordinated strategy on nutrition research needs that integrates the view of the food science and nutrition community. Mechanisms for increasing the awareness of the contributions of food science, and human nutrition research to societal goals as well as enhancing greater interactions among professional groups, the private sector, and federal agencies is explored. Members include Esther Winterfeldt, Ph.D. (ADA), James R. Kirk, Ph.D. (IFT), Katherine Clancy, Ph.D. (SNE), James L. Vetter, Ph.D. (AACC), and Dr. Reginald Tsang, Ph.D. (ACN).

MEMBER SOCIETIES

American Dietetic Association (ADA)

The American Dietetic Association is a national organization representing 47,000 dietitians and dietetic technicians. The objectives of the association are: to improve the nutrition of human beings, to advance the science of dietetics and nutrition, and to promote education in these and allied areas.

Registered Dietitians provide expert nutritional care based on their specialized education in the biological sciences, foods and food science, the behavioral sciences, and in management systems.

Communications within the association include *The ADA Courier*, issued six times per year, and *The Journal of the American Dietetic Association*, issued monthly. As a means of providing information, position papers, scientific publications, meetings, and statements on legislative and public policy issues are utilized. Reaction statements to proposed regulations and testimony before Congressional committees are regularly provided by the association. Continuing education activities through conferences, workshops, cassette series, and professional meetings are provided for members.

National Nutrition Month, a yearly event sponsored by the association, is for the purpose of creating a public awareness of the importance of adequate nutrition. This activity supports one of the goals of the association, which is nutrition education for the public.

American Institute of Nutrition (AIN)

The American Institute of Nutrition is a professional society of 2,000 nutrition scientists which develops and extends nutrition knowledge and facilitates personal contact between members. Members of this society include scientists in nutrition and related fields from universities, medical institutions, and industry elected by fellow scientists on the basis of demonstrated research competence and productivity in the field of experimental nutrition. AIN publishes the monthly *Journal of Nutrition* and the quarterly *AIN Notes*. It also co-sponsors meetings with scientific societies to present nutrition research findings, and awards for outstanding nutrition research efforts.

The AIN participates in the public affairs activities of the Federation of American Societies of Experimental Biology. In addition, the committee, Public Nutrition Information, provides scientific information on nutrition, explaining dietary needs, the role of nutrition in public health, and the question of safety of food supply. The committee also attempts to combat nutrition misinformation through print and broadcasting media, as well as in personal communication, whenever the opportunity arises to refute erroneous material that has been published or circulated.

American Society for Clinical Nutrition (ASCN)

The American Society for Clinical Nutrition is a professional society of 500 nutrition scientists elected to membership by their fellow scientists on the basis of demonstrated research competence and productivity in the field of clinical nutrition.

The objectives of the ASCN are to encourage undergraduate and graduate nutrition education, particularly in medical schools, to foster research in human nutrition in health and disease, to provide opportunity for investigators to present and discuss their research in human nutrition through the *American Journal of Clinical Nutrition*, and to promote the proper application of the findings of nutrition research to the practice of medicine and related health professions. Members of the Society have a special obligation and a unique opportunity to help make reliable nutrition information readily available and to speak out against nutrition misinformation or unwarranted extrapolations.

As members, ASCN participates in the public affairs and public information programs of the Federation of American Societies for Experimental Biology and the Council of General Medical Societies. The Society's Committee on Clinical Nutrition Issues in Health and Disease responds to requests from the Council in providing state-of-the-art summaries for the nutrition and legislative communities on clinical nutrition.

American Society for Parenteral and Enteral Nutrition (ASPEN)

The American Society for Parenteral and Enteral Nutrition's 3,500 members are health care professionals (physicians, nurses, dietitians, pharmacists, nutritionists, etc.) dedicated to the fostering of good nutritional support of patients during hospitalization and rehabilitation. By promoting the team approach and by educating health care professionals at all levels, ASPEN encourages the development of improved nutritional support procedures and improved patient care. ASPEN also undertakes the development and validation of guidelines for the nutritional assessment and support of individuals in both disease and healthy states. ASPEN provides information through the *Journal of Parenteral and Enteral Nutrition, ASPEN Update*, and a variety of monographs, as well as a wide program of national, regional, and local nutrition-related educational activities.

Institute of Food Technologists (IFT)

The Institute of Food Technologists is a worldwide society of 18,000 professional food technologists, scientists, engineers, executives, and educators in the field of food and related technology. The Insitute's major objectives are the promotion of the application of science and engineering to the improved production, processing, packaging, distribution, preparation, evaluation, and utilization of foods in order to provide better and more adequate diets for mankind.

IFT publishes scientific background papers on food technology issues, conducts regional and annual meetings for the scientific community, and publishes two journals — the monthly *Food Technology* and the bi-monthly *Journal of Food Science*.

An IFT network of Regional Communicators (professional food technologists primarily from the academic community) act as news-media contacts across the nation. Scientific Status Summaries are developed by IFT's Expert Panel on Food Safety and Nutrition, thoroughly reviewed by peers, and distributed in the name of the Regional Communicators. News releases highlighting the Summaries accompany them and are frequently the major text cited in the media. These Communicators are frequently called by media people on related topics to provide feature material, expand on wire service stories, or to serve as expert guests on TV/radio shows.

Society for Nutrition Education (SNE)

The Society for Nutrition Education is an organization of 6,000 nutrition professionals active in nutrition education. The Society's primary goal is to promote nutritional well-being for all people through education, communication, and education-related research. It prints nutrition education resource listings for pre-school, primary, and secondary training, as well as for health professionals, and has produced four educational films. It also publishes the quarterly *Journal of Nutrition Education* and a newsletter for members, the *SNE Communicator*. The Society maintains a nutrition education resource center containing publications and films.

The SNE Public Policy Advisory Council and its ad hoc special interest task forces develop position statements related to public policy for SNE. The Legislative network disseminates public affairs information to the members. Divisions link members with particular nutrition education interests: Higher Education, Industries, and Children and Public Health.

LIAISON SOCIETIES

American College of Nutrition (ACN)

The American College of Nutrition is a professional organization with 400 members. It was organized in 1959 by physicians representing various specialties who had demonstrated expertise in clinical nutrition. Fellows of the College must be certified in a medical specialty and have demonstrated experience in the application of clinical nutrition through teaching, patient care, and publications.

The purpose of ACN is to foster and encourage nutrition education for physicians, research investigators, and medical students. A major function is to stimulate the exchange of information on nutrition among health practitioners, nutrition educators, and basic scientists to introduce the investigator to clinical nutrition problems, and the clinician to new developments in clinical and experimental research.

The American College of Nutrition holds an Annual Meeting and other continuing education programs, and publishes proceedings or presentations related to the theme of the meetings. The College has sixteen Councils representing the various medical specialties that review papers for publication and develop presentations for the annual meeting. These include councils on nutrition, perinatology/pediatrics, gerontology, cardiovascular and renal diseases, endocrinology, surgery, gastroenterology, magnesium and trace substances, and oncology/hematology.

American Association of Cereal Chemists (AACC)

The American Association of Cereal Chemists, founded in 1915, is an international scientific society which encourages research, develops analytical methodology, and provides educational and informational resources related to cereal grains. Its more than 3,000 members are technically trained persons working in the cereal processing industry, as well as government and universities.

The Association has a Nutrition Division, founded in 1980, which is developing programs in nutrition communication, research, and related areas. Other divisions within the AACC include Milling and Baking, Flavor and Additives, Protein, and Carbohydrate.

FINANCIAL SUPPORTERS

American Maize Products Company

Burger King Corporation

Carnation Company

CPC North American

Frito-Lay, Inc.

General Foods Corporation

General Mills Foundation

Gerber Products Company

Hoffman-LaRoche, Inc.

ITT Continental Baking Company

M&M Mars

McCormick & Company, Inc.

McDonald Corporation

Mead Johnson

Nabisco Brands, Inc.

Nelco Division, NPI Corporation

Nestle Coordination Center for Nutrition, Inc.

Pennant Products, Inc.

Quaker Oats Company

The Arthur D. Little Foundation

The Coca-Cola Company

The Kroger Company

The Pillsbury Company Foundation

The Proctor & Gamble Company

Thomas J. Lipton Foundation, Inc.

Uncle Ben's, Inc.

William Underwood Company

The National Nutrition Consortium is an independent association supported by voluntary contributions. It is exempt from federal income taxes under Section 501(c)(3) of the Internal Revenue Code. Gifts in support of the NNC are tax deductible as provided by law.

PUBLICATIONS

NUTRITION ALERT A two-page summary of public policy issues on food and nutrition is prepared within two-three days of any action in legislative, regulatory, or other agencies. The summaries contain the Who, What, Where, When, Why, and How necessary to actually participate in the development of public policy, and are proving increasingly popular. Subscriptions are $20.00 for society members, $30.00 for institutions.

PUBLIC AFFAIRS COLUMNS The Consortium staff prepares a quarterly public affairs update and distributes it free for publication by the societies in their own newsletters or magazines. The Public Affairs Committee serves as an editorial board for the column.

Public Policy Statements Position papers by the Consortium include:

GUIDELINES FOR A NATIONAL NUTRITION POLICY
Revised edition, 1980, 4 pages

NUTRITION EDUCATION POLICY
1980, 8 pages.

FOOD SAFETY POLICY
1979, 8 pages.

NUTRITION LABELING POLICY
1978, 3 pages.

VITAMIN—MINERAL: SAFETY, TOXICITY, AND MISUSE
1978, 36 pages.

VITAMIN B15 - PANGAMIC ACID
1978, 1 page.

MEGAVITAMIN THERAPY
1979, 2 pages.

LAETRILE - VITAMIN B17
1976, 1 page.

WATER FLUORIDATION
1976, 1 page.

DIETARY RECOMMENDATIONS FOR THE AMERICAN PUBLIC
1981, 7 pages

STATEMENT ON SODIUM LABELING OF FOOD
1981, 2 pages

Resource Materials Documents produced for use by scientists, educators, or the general public include:

NUTRITION LABELING—HOW IT CAN WORK FOR YOU
Third printing, 1980. 134 pages.

DESCRIPTION OF NNC FELLOWSHIP PROGRAM FOR GRADUATE STUDENTS

NUTRITION EDUCATION REFERENCES, REVIEWS, AND RESOURCES FOR PERSONS WITH DIET RELATED DISEASES
(Appendix to report of Task Force IV for National Nutrition Education Conference, September, 1979)

Combined list of publications and information from NNC member organizations on:
- **ACADEMIC TRAINING IN FOODS AND NUTRITION**
- **CAREERS IN FOODS AND NUTRITION**
- **SCHOLARSHIPS IN FOODS AND NUTRITION**

LIST OF GRADUATE PROGRAMS IN NUTRITION IN THE U.S. - (based on 1975 reporting to AIN)

SELECTED ACRONYMS - NUTRITION IN GOVERNMENT - Revised 1981.

For further information about the NNC publications, please write or call:

National Nutrition Consortium, Inc.
24 Third Street, N.E., Suite 200
(202) 547-4819

Mr. **Brown**. Thank you very much, Dr. Hurt.

I must say that all of the members of the panel have presented really exceptional testimony in support of a more coherent program of nutrition research. I especially appreciate your quoting me so extensively, Dr. Hurt.

My statements there do not represent a casual interest. I have felt for a number of years that there was a greater role for the professional community, in both industry and academia, in helping formulate policy plans for the benefit of all of the people of the country.

The Congress attempts to do that, and the executive branch attempts to do that. But we see the difficulties perhaps epitomized in this area of nutrition research where we have a multitude of bureaucracies and a multitude of interests within those bureaucracies reflected. While this is normal, I am not pointing to it as an evil, it still sometimes inhibits the development of a sound, fully articulated policy course which can be supported by all of the resources that we have.

So I am grateful to you for making that point again, and I will continue to raise it as a challenge to the professional community.

I would like to ask Mr. MacKay if he would like to raise any questions?

Mr. **MacKay**. This last panel has been very helpful to me in getting a better perspective on problems.

I don't really have that much in the way of questions. I didn't quite understand how the two programs tied together, the USDA and the NIH. Dr. Nesheim, I guess, you probably did a good bit to help me understand how those two come together.

In general, would I be summarizing your views if I said that, because of budgetary constraints or otherwise, in fact, the Federal effort is decreasing, declining in terms of budget, as you see these?

Dr. **Nesheim**. I don't have figures that would support saying it is declining.

What I would say is certainly the Competitive Grants program started out at $5 million a few years ago and, now, I think it is down to about $2 million. That is an extraordinarily small amount of extramural funds that have been put into programs.

Also, from USDA's perspective, those funds are now very restricted in terms of the kinds of things that they can support. I think that, from USDA's perspective, which has a broad mandate in a number of areas in nutrition, that I would like to see the mandates, or at least the guidelines, for the Competitive Grants broadened so it can support a number of the areas of nutrition that USDA has responsibility for.

Mr. **Brown**. Would the gentleman yield to me at this point?

Mr. **MacKay**. Yes.

Mr. **Brown**. I have been a strong proponent of the Competitive Grants program. I helped initiate it, as a matter of fact. And I want to point out what I understand the current situation is. The administration has actually asked for $21 million for Competitive Grants in the Department of Agriculture for agricultural research in general, not just nutrition. Due to longstanding problems within the House, the House Appropriations Committee has cut that in half—or more, down to $10 million—while I think the Senate has gone along with the administration on this. The problem is not yet resolved. It will be in conference.

This has happened before, and the Congress has resisted appropriating as much as the administration has requested, which is regrettable. I think $21 million is inadequate enough. But if we could at least get that much, the situation for competitive nutrition research grants would be greatly improved, and I think we would be much better off. I hope we can achieve that.

Dr. NESHEIM. I certainly would support that.

In terms of what we see happening in Health and Human Services through NIH, certainly support for individual research grants in general has been declining. I mean, as the numbers have been held constant, as Dr. Rosenberg points out, we have been getting cuts now on individual grants each year.

I chair this coming year the Nutrition Study Section at NIH, and we increasingly are seeing grants that we are able to give what we consider really good priorities not being funded as they come back around the next time. So the support for really good fundamental research, I think, through the NIH system for nutrition, as it is in other areas, is declining.

Mr. MACKAY. Dr. Rosenberg, in your prepared statement, you indicated that you see a strong need for a congressional mandate in this area.

Dr. ROSENBERG. Yes. I think the—as I view it as an outsider—push and pull of the Federal Government in regard to limited budget—I think we saw from that science article, and so forth, what has happened at the NIH. Organizations outside the NIH, in a sense, mandate major priority decisions which have an enormous impact with individual programs, such as the small but I think the important, program represented by the clinical nutrition research units.

I think that the only way to set that right, two things have to happen. I think Congress has to express its concern that those programs not only continue to be funded, but that that program, in order to achieve its goals, really needs to be expanded by another five or six units, as was originally hoped, and that there is money put into this area so that it does not have to be in direct, head-to-head competition with what I think is the scientific mainstay of the National Institutes of Health, the investigator-initiated grants. So I think that there needs to be an expression of mandate and there needs to be some money.

Mr. MACKAY. Thank you.

Mr. BROWN. Of course, the other side of the coin of my exhortation to professionals to engage in the process of policy planning and assist the Federal Government in achieving more coherent and more effective use of the taxpayers' resources is that nobody is going to listen to you unless you also engage in a certain amount of that dirty activity known as lobbying or political participation, or whatever you want to call it. They are two sides of the same coin.

Let me ask you this. All of you, I think, have made reference in one way or another to the National Nutrition Monitoring System and various aspects of it. These programs are not specifically authorized by law. That is, they are not included in any act, nor is there a line item budget for it, as far as I know. I stand to be corrected if I am wrong. But my question to all of you is: Do you think that the importance of these programs is sufficient to warrant a specific legislative authorization and perhaps a multiyear funding level to be specified in the appropriate acts of Congress?

Arguments can be made on both sides of this kind of a situation, but I would like to just get your views, off the top of your head.

Dr. **Leveille**. Let me give you one point of view, Congressman.

I don't think there is any question but that—in my mind at least—this kind of an activity is incredibly important to this country. Health monitoring, including monitoring of nutritional status, should be very clearly an ongoing activity in a country as affluent as the United States. There is simply no excuse, in my mind, for not having an effective program. So, clearly, funding is essential for that, and it probably should be a mandated activity.

But I would go on to point out that whatever the activity ultimately is, it should be part of a clearly defined objective plan, and not the effort scattered amongst several different agencies.

Dr. **Hurt**. I would just agree with Dr. Leveille, with the full realization, though, that to make satisfactory progress in this area of trying to improve human health relayed through nutrition or another means, one must recognize that nutrition is only one small chip in this total mosaic of health. In order to make satisfactory progress, you are going to have to motivate the individual free-living human being to pay attention, and I think we all march to different drummers. So one must be realistic in the expectations of such a program.

Mr. **MacKay**. Mr. Chairman.

Mr. **Brown**. Mr. MacKay.

Mr. **MacKay**. In some ways, we don't give the American consumer enough credit. I think the consumer is way out ahead of Government in this area. I think the thing that is holding it back—and I hear the medical profession and others say that you can't make the consumer do anything—you can give them good information and they can figure out what is in their own best interest and, right now, they are not getting the best information.

Dr. **Hurt**. I agree.

Mr. **MacKay**. That is what I think the role of Government ought to be.

Mr. **Brown**. I recognize that HANES, for example, is merely a subset of our needs as far as epidemiological activities and a number of different areas. It is, in effect, an effort to relate health and nutrition, but we need to relate health to other things as well as nutrition.

One of the arguments that could be used against specific authorization for HANES, for example, or other such activities, is that it is only a partial answer to the health and epidemiological research needs of the country. I don't know how to appropriately weight this argument. In a sense, I am not sure what significance we should give to health and nutrition surveys as compared to, say, exposure to carcinogens in the environment in general or something like that, which we also perhaps need, I don't know.

Dr. **Nesheim**. Could I just make one comment on this?

One of the things that we do in my own department at our center, funded by the Agency for International Development, is conduct nutrition surveillance activities in develping countries around the world. So I have faculty with expertise in helping individual countries set up nutrition surveillance systems. I think we have been more successful in getting interest in nutrition surveillance outside of the United States than we have within the United States.

But the point that we have always tried to make in working with the nutrition surveillance system is to point out that it is not enough just to gather the data, you have to link the system of monitoring and surveillance to some kind of way of making policy that is going to deal with the issue. In other words, gathering data for data-gathering sake is not a very useful exercise. And I think that one of the things that the Congress has asked for is assistance in helping make nutrition decisions, policy decisions. If you make that on the basis of knowledge—the question you asked this morning, Mr. MacKay, about what is the nutrition status of the people of the United States, is a very relevant question in terms of trying to make the decisions that you have to deal with in this regard.

So I think that any nutrition surveillance system that we set up has got to be linked with those concerns that you have in trying to make those kinds of decisions.

Mr. **Brown**. Dr. Nesheim, haven't we actually learned a great deal about the role of nutrition and health, as well as some other things, based upon what we have learned from other countries, such as the impacts of certain dietary habits on the health of the Japanese or the Chinese?

Dr. **Nesheim**. Absolutely. You have to do nutrition research on an international scale because the laboratory to do that is really found throughout the world, and you can get a lot of information from outside this country.

Mr. **Brown**. Again, gentlemen, you have been very helpful to us.

Without objection, I will include in the record the policy statement of the NNC and the annual report which you submitted, Dr. Hurt.

Mr. **Brown**. We may want to propose some additional questions to you in writing, if you don't object to answering them.

I think this is an appropriate place to close the hearing, since we have another rollcall on the floor.

Thank you very much.

The subcommittees will be adjourned.

[Whereupon, at 1:07, the subcommittees were adjourned.]

APPENDIX A

The Role of the Federal Government in
Human Nutrition Research

Hearing by the Subcommittee on Science, Research and Technology
and the Subcommittee on Department Operations, Research
and Foreign Agriculture

July 14, 1983

Follow-Up Questions for Department of Health and Human Services

1. National Nutrition Monitoring System

   a. What was the role of DHHS in obtaining Advisory Council status for the Evaluation Committee of the Nutrition Status Monitoring System? Why did the clearance take one year? Since the Evaluation Committee has not met, when can Congress expect to receive the report on the nutritional status of the population originally scheduled for FY '84?

      Answer: In planning for the Joint Nutrition Monitoring Evaluation Committee, it was decided that the Department of Agriculture would take the lead in obtaining approval for the committee. The charter for the committee was developed by staff of the Human Nutrition Information Service, USDA, and the National Center for Health Statistics, DHHS. The charter required approval by both Departments before being submitted by USDA to the General Services Administration for clearance and to the Office of Management and Budget for approval. The time required to obtain approval for the Committee was long because of the necessity for clearance by two Departments and because of the need to address questions raised by OMB staff. The Congress should receive the report on schedule, probably late in FY '84. During the time that the charter was in clearance, potential members were identified and agency staff began to assemble the information that the Committee will require.

   b. What is the probability of beginning the first coordinated National Nutrition Monitoring System surveys in 1987 as called for in the Implementation Plan? When will the interlocking survey design be completed? What impact will the FY '83 and FY '84 budgets have on the Department's ability to conduct the first coordinated survey in 1987?

      Answer: At this point, planning for the third National Health and Nutrition Examination Survey (NHANES III) has started and no obstacles are foreseen to beginning the survey in coordination with the Nationwide Food Consumption Survey in FY '87. Survey design will be completed in FY '86. The budget in FY '83 and '84 is adequate for planning NHANES III. FY '83 and '84 budgets will support the planning required to conduct a survey coordinated with the Nationwide Food Consumption Survey in FY '87. Operating budgets for 1985, 1986 and 1987 have not been developed.

c. DHHS belatedly joined USDA in a contract to address user needs of national food consumption data. Do you plan to hold a workshop on the user needs of nutritional status data? Do the user needs of both types of data require review prior to determining the most effective design for the 1987 coordinated surveys?

Answer: In planning for NHANES III, the needs of users of the health and nutritional status data will be ascertained through a series of activities. The needs of users of health, food consumption and nutritional status data require review in planning the next NHANES, and in improving coordination between NHANES and the Nationwide Food Consumption Survey. We will seek review by a group of nutritionists and physicians of the nutritional status assessment planned for NHANES III. We have not yet decided on a final plan, but among the additional methods that will be used are:

- letters to Federal agencies soliciting topics to be included. Follow-up personal contacts will be used to obtain more specific information on items which appear to be reasonably good prospects for inclusion in the survey;
- nutritional status data users workshop. Such a workshop could be held in conjunction with meetings of professional societies such as the American Public Health Association, the American Institute of Nutrition, or the American Society for Clinical Nutrition;
- advertisements in professional journals. This approach would seek to obtain a wide range of opinions from health planners, health and nutrition researchers, medical care providers, and health and nutrition educators.

d. What is the view of the timeliness of data and analysis for NHANES (National Health and Nutrition Examination Survey)? What resources would be needed to complete analysis and interpretation of NHANES I and NHANES II data by FY '85?

Answer: Improvements in timeliness are notable and the data are being widely used. Increased speed in making the data available to even more users remains, however, a high priority task. Completing analysis of NHANES I and II data by the end of FY '85, would require considerable investment of resources. A proposal developed by staff of FDA and NCHS calls for analytic contracts, upgrading computer software for easier data accessibility, development of consultant panels to review issues of data interpretation, validity and analysis, increased computer and support personnel, and other items to facilitate data analysis on a continuing basis. This comprehensive proposal is being reviewed, including an assessment of possible required resources.

The National Center for Health Statistics has already taken steps to improve the timeliness of releasing NHANES and Hispanic HANES results:

- a microdata tape release program has resulted in distribution of over 1,000 data tapes to universities, private organizations and Federal agencies. Articles appearing in the literature document the growing success of this effort;

- technical assistance is provided to data users of the microdata tapes and data-users meetings are being conducted regularly to encourage appropriate analyses of the NHANES data, and to encourage grant applications to funding agencies with programmatic interests;

- collaborative analysis efforts with staffs of the Food and Drug Administration, Environmental Protection Agency, the National Institutes of Health, and the Centers for Disease Control are under way;

- NHANEs II and Hispanic HANES data have been, or are being, processed soon after data collection and will be released on a much more rapid schedule than their NHANES I counterparts.

e. The Subcommittees received a statement for the record from the Association of State and Territorial Public Health Nutrition Directors which reads, "It is our view the HANES and the NFCS could, and should, become required Federal research surveys, to be scheduled and budgeted at reasonable intervals, and mandated to develop improved survey methods that would not only increase the utility of the data to State and local users but also advance the state-of-the-art for economic small surveys in states and other smaller areas." Would you comment on the feasibility of implementing this recommendation?

Answer: HANES is not specifically mandated in legislation at the present time, and there is no specific budget line item for HANES. However, sufficient authority exists for the continued conduct of the survey in the legislative authority for the National Center for Health Statistics (Section 306 of the Public Health Service Act); similarly, detailed budget information is submitted to the Appropriations Committee in the annual Congressional Justification of the President's Budget, affording the Congress the level of detail necessary to make decisions on the HANES program. It is our view that current legislative authority and budget procedures are sufficient, and that additional specificity is unnecessary; HANES is given high priority both within NCHS and the Department, and no other NCHS data collection activity is specifically mandated by name.

Staff of NCHS, FDA, CDC, NIH and other Public Health Service agencies are considering long term research activities to enhance the National Nutrition Monitoring System's (NNMS) data collection and analysis program. Some examples of research areas that will be considered include adapting or developing clinical techniques for use in the NNMS; the relationships of body composition, skinfold measurements, weight and height to health and longevity to aid in interpreting population data; and dietary intake methodologies that are more easily related to health and nutritional status. Improved survey methods are also under study, including the costs and benefits of continuous surveys and different modus operandi for NHANES. The ultimate goal of these research initiatives is to increase the usefulness of the survey data to decision makers at the Federal, State and local levels.

f. Do you plan additional subpopulation surveys following the Hispanic HANES?

Answer: Additional subpopulation surveys similar to Hispanic HANES are not planned for the immediate future; NHANES III is now the top priority. As part of the planning for NHANES III, we are considering alternative methods of obtaining desired health and nutritional status information on special population groups, e.g., the poor, the elderly, racial or ethnic minorities. In NHANES III and future national surveys, one approach being given serious consideration is to oversample special population groups. The groups would be selected based on the needs of data users.

2. Human Nutrition Research and Information Management System

a. How will DHHS use this system to plan research priorities for budget requests and to manage programs within each fiscal year?

Answer: The Human Nutrition Research Information Management System (HNRIM) will establish a focus for information on all projects in human nutrition research funded by the Federal Government. This focus will enable for the first time a global view of all Federal efforts in human nutrition research and therefore help to plan and establish research priorities and to manage nutrition programs. The system will facilitate the identification of agency responsibility in human nutrition research; the identification of the progress made in human nutrition research; the development of joint program announcements (PAs), requests for applications (RFAs), and requests for proposals (RFPs) in areas of nutrition research that require emphasis; and the development of joint funding mechanisms. In addition, the HNRIM system will make it possible for investigators to ascertain which investigators are working on problems relevant to their work, thus facilitating communication among scientists working in Federal laboratories, academia, and industry. The development of a plan for human nutrition research within the Federal Government will encourage new investigators to enter the field of nutrition research and thus increase the number of meritorious applications. After the system has been operational for a number of years, it will permit the review of trends in human nutrition research which will further enhance future planning of research activities. This kind of review has not been possible in the past due to the lack of a consistent data base of federally-supported nutrition research activities.

3. Research, Priorities, Funding and Mission

a. Last June, the Department indicated a review of the NAS Diet, Nutrition, and Cancer report was under way and the review could be used to guide relevant research prior to receiving the June 1983 supplement on Directions for Research. How was the review integrated into DHHS research planning activities for FY 84 and FY 85?

Answer: During FY 82 and FY 83, the National Cancer Institute (NCI) developed research plans in the area of diet, nutrition and cancer and in the area of chemoprevention. These research plans were developed by NCI staff with input from the scientific community and were reviewed by NCI advisory boards in the spring of 1983. The NAS Diet, Nutrition, and Cancer report of 1982 was one of several sources used by the NCI staff in its planning process. The NAS report was of value in determining priorities, specifically in assigning high priority to the areas of dietary fat and dietary vitamin A. These priorities are reflected in the research planning activities for FY 83 - FY 85. In FY 84, NCI will initiate two clinical trials of low fat diets aimed at reducing the incidence of breast cancer and at improving the prognosis of patients with breast cancer. In FY 85 these two studies will move from a feasibility stage to full scale implementation. Also in FY 84, NCI will sponsor studies of modification of eating behavior with particular emphasis on reducing dietary fat.

By the end of FY 83, NCI will be sponsoring seventeen clinical trials in chemoprevention and fourteen of these will be studying a form of vitamin A. The forms of vitamin A being studied include the provitamin (betacarotene), various forms of the natural vitamin, and various synthetic analogues. This area of research will be expanded in FY 84 and FY 85 with particular emphasis on development of synthetic analogues of vitamin A which have greater efficacy and/or less toxicity. The expanded research will include evaluation of selected agents in animal models, animal toxicology and safety determinations, Phase I clinical studies and Phase III clinical trials.

b. What Department-wide planning mechanisms are used to determine human nutrition research priorities and to allocate funds among NIH, CDC and other agencies such as FDA?

Answer: Several mechanisms are operative to facilitate the determination of human nutrition research priorities. An NIH

Coordinating Committee on Nutrition Activities operates out of the Office of the Director at the National Institutes of Health. Discussions growing out of the meetings of that Committee help to identify and advance research priorities. At the departmental level, information exchanged at the bi-monthly meetings of the departmental Nutrition Policy Board (for which the NIH Committee acts as the standing Subcommittee on Nutrition Research) further promotes discussion of nutrition research priorities. In addition, ad hoc reviews, such as the departmental task force established to review the NAS Report on Diet, Nutrition, and Cancer, help to identify priorities of importance to the various agencies and institutes. Plans are also under way to initiate in the coming year a formal and comprehensive review of nutrition research activities under the auspices of the newly established Interagency Committee on Human Nutrition Research.

c. How does the Bureau of Foods obtain its applied and basic research needs on which to base regulatory decisions? Are th Bureau's research needs submitted to other agencies in DHHS for consideration in Department research planning and budget proposals?

Answer: The breadth of research required by the Bureau of Foods is large. The research needs continue to evolve commensurate with knowledge and technological advancement and a continuously changing food supply. The Bureau developed a research plan in 1980 which defines areas in which increased research efforts are required to resolve public health issues associated with the food supply. This document has been made widely available to other institutions to be used when planning research. The Bureau endeavors to utilize relevant knowledge developed by other institutions, both public and private. Collaborative efforts with other institutions in the planning and conduct of needed research, particularly the U.S. Department of Agriculture, greatly enhances the ability of the FDA to perform its regulatory mission. The FDA nutrition program is dependent upon the basic biomedical research output of NIH activities, the nutrition and dietary status evaluations of the National Center for Health Statistics, the food consumption surveys of USDA, and the National Nutrient Data Bank of USDA. Contemporary science is highly specialized and no single institution can perform all of the research. Consequently, the Bureau maintains an intramural research program that is augmented with a modest extramural program to address some of the high priority issues.

d. Does the Bureau of Foods conduct research to determine the underlying causes of complications resulting from products which it regulates, such as the liquid protein diet products? Who does, or should, conduct such research? Should this be the responsibility of the Federal Government or the private sector?

Answer: The Food and Drug Administration, as the principal agency responsible for disease prevention and health promotion as they pertain to our food supply, carries out nutrition research of great importance to all Americans. The FDA conducts research required in support of its Food, Drug, and Cosmetic Act mission to ensure the safety, quality and labeling of foods. Its principal mission is to maintain the safety and quality of our nation's food supply. This encompasses activities designed to assure that the nutritional quality of foods is maintained -- activities such as the food fortification program which ensures that the fortification processes used by industry are conducted in a manner conducive to the maintenance of the nutritional safety and quality of foods. The Agency does conduct very important nutrition research to assure nutritional quality. In addition, FDA is charged with the regulatory responsibility for assuring the safety of food additives and other food ingredients. Of particular importance, FDA conducts studies to assess the impact on human nutrition of technological developments, changes, and marketing practices in the food industry. Often FDA is faced with the need to respond quickly to health emergencies such as the liquid protein diet tragedy that occurred during 1977 and 1978. Although FDA is concerned with real-life problems in the area of nutrition affecting the national health, the research it must undertake frequently requires the acquisition of basic biological information, without which an understanding of the mechanism that underlies a given problem would be impossible. Other public and private institutions have conducted research to enhance basic biological understanding and to determine the underlying causes of complications resultant from foods regulated by FDA. As an example, NIH is currently investigating children who presented with hypochloremic metabolic alkalosis from the consumption of an infant formula that contained an insufficient quantity of chloride. However, other institutions cannot be expected to perform the necessary research on all such problems identified in the food supply and industry is most likely to address only those problems that have direct economic ramifications.

The responsibility pertaining to the safety of food additives and color additives is clearly defined. FDA, under the authority provided by the Food, Drug, and Cosmetic Act requires data that demonstrate the safety of food additives and color additives prior to their approval. The sponsor of such research is usually the industry. Much of this research is conducted by academia and foundations with funds provided by industry or it may be conducted by industry.

e. What is the role of FDA in monitoring or regulating vitamin/mineral supplements?

Answer: Vitamin and mineral supplements are regulated in accordance with the Food, Drug and Cosmetic Act. Some supplements are regulated as drugs while other supplements are foods. Those supplements represented for therapeutic uses are drugs. However, the vast majority of supplements currently being sold are foods. According to the law, the upper limits of such supplements, except those for children and pregnant or lactating women, cannot be regulated based on modern knowledge of nutrient requirements. These products can only be regulated on the basis of safety. Safety concerns arise from two factors. One is the paucity of knowledge of human toxicity. Secondly, the consumption of supplements has been increasing rapidly during recent years and is contributing to intakes considerably in excess of physiological needs. The FDA has just completed a national survey to determine the prevalence of supplement uses. This survey will also provide estimates of the amounts of each vitamin and/or mineral being consumed.

f. The Private Sector Task Force recommended the transfer of some of the USDA Human Nutrition Research Centers to DHHS because the Centers were conducting clinical research which was outside the mission of USDA. What is your view of the clinical nature of USDA research and what benefits, if any, would be realized by the recommended transfer?

Answer: The USDA Centers on Human Nutrition Research complement the research supported by NIH. The Centers at Baylor and Tufts Universities have special interagency agreements with NICHD and NIA, respectively, because their nutrition research programs are related. The USDA Centers concentrate on research on the nutritional requirements of healthy persons. Since some of this research needs to be carried out in a clinical setting, collaborative mechanisms have been arranged. Since the establishment of the Centers, a satisfactory collaborating mechanism has developed between USDA and the NIH and has expanded the scientific basis of nutrition research. If in the future the USDA Centers need to concentrate their research more in clinical areas a reassessment can be undertaken. But at present there is no need for change.

4. Joint Subcommittee on Human Nutrition Research

a. Did you consult member agencies of the JSHNR, other than USDA, prior to recommending its termination to Dr. Keyworth? Did you consult the Directors of the Bureau of Foods and the Clinical Nutrition Research Units, or the Chairman of the Committee on Health and Medicine of the Federal Coordinating Council for Science, Engineering and Technology? What were their recommendations?

Answer: Our recommendation to transfer responsibilities of the JSHNR to the departmental level was based on our respective consultations within our own Departments, on the management and scientific issues involved. For HHS those consultations included representatives from the National Institutes of Health, the Food and Drug Administration and members of our departmental Nutrition Policy Board. We feel confident that the newly established Interagency Committee on Human Nutrition Research will work effectively to extend the progress of Federal commitment to human nutrition research activities.

APPENDIX B

The Role of the Federal Government in
Human Nutrition Research

Hearing by the Subcommittee on Science, Research and Technology
and the Subcommittee on Department Operations, Research
and Foreign Agriculture

July 14, 1983

Follow-Up Questions for Deparment of Agriculture

1a. Question. When can Congress expect to receive the plan? How do you plan to provide for broad participation from the academic and private sectors in the development of the plan?

1b. Question. What agency and position has been assigned responsibility for USDA's contribution to the plan? What Department and position has accepted the responsibility to coordinate this activity among all Departments involved?

Answer (a & b). The highest priority of the newly created interagency Human Nutrition Coordinating Committee is to continue the excellent work begun by the Joint Subcommittee on Human Nutrition Research toward the development of a Human Nutrition Research Plan. The Committee is co-chaired by Assistant Secretary Bentley (USDA) and Assistant Secretary Beant (HHS) and has representatives from eight agencies and/or departments with an active interest in Human Nutrition Research. Both secretaries have assumed the responsibility for this task. It is our intent to involve those members of the academic and private sectors who participate in this research through Federal support; specifically, the Human Nutrition Research Centers in USDA and the Clinical Nutrition Research Units in HHS. It is difficult to project when a completed plan will be ready, however, it is the intent of the Committee co-chairman to keep Congress informed of progress through yearly reports.

2a. Question. When was the last time the Department completed a comprehensive review of the mission and effectiveness of the Centers? Please provide a brief summary of the review. When is the next program review planned and who will conduct the review?

Answer. A comprehensive review of the mission and effectiveness of ARS Human Nutrition Research including the Human Nutrition Research Centers was completed during FY 82. A comprehensive report was prepared and is available. (see attached following these questions)

There are a number of reviews scheduled for the near future. The program at the Human Nutrition Research Center on Aging will be reviewed by the standing Executive Committee on October 7, 1983. The program at the Human Nutrition Research Center at Baylor will be reviewed November 8-10, 1983, by a Board of Scientific advisors. There is also a Task Force made up of USDA and outside scientists and administrators who will conduct a program planning conference of Human Nutrition Research in ARS and its relationship to other Agricultural Research. Its first meeting is scheduled for September 21-23, 1983.

2b. Question. How many Federal Employees are currently employed at the Baylor and Tufts Centers? Please provide an up-date on the Department's plans to operate the Tufts Center as a GO-CO (Government owned-contract operated)?

Answer. There is presently one Federal employee at the Baylor Center. He is the Assistant Director for Operations. All research is carried out by Staff members of the Baylor College of Medicine. There are presently four Federal employees at the Tufts Center. The Director, Associate Director, Head of the Nutrtion Evaluations Laboratory, and a Secretary.

The request for proposal for the management operations and maintenance of the USDA Human Nutrition Research Center on Aging at Tufts University has been released to Tufts University for their formulation of technical and cost proposals. A technical evaluation panel has been selected and a Scientific Program Officer located at Tufts and an Assistant to the Deputy Administrator for Human Nutrition, National Program Staff, Agricultural Research Service (ARS) will exercise all delegated authorities in approving, coordinating, and evaluating contractor-proposed and conducted research activities responsive to the Statement of Work contained in the contract. ARS personnel will assure that program and scientific provisions of the GOCO contract are met and the Federally-owned HNRCA research facility is propertly maintained.

2c. Question. The House Appropriations Committee report for FY 84 recommends $6.9 million in planning funds for the Human Nutrition Research Center at Baylor. Is USDA planning to build a Federal facility for this Center? When do you plan to request funds for research to fully utilize this Center?

Answer. The USDA conducted in collaboration with Baylor College of Medicine a feasibility study to determine the best possible way to supply adequate facilities to carry out its research program. Presently the program is carried out in leased space in a medical building adjacent to Baylor. It was determined that a separate facility is required, however, the options are open. No target date has been set to request funds for construction.

2d. Question. At the May USDA National Advisory Council for Maternal, Infant and Fetal Nutrition, FNS announced a study to develop better determinants of nutritional status of children. Is this research to be contracted out or is it a part of the current functions of the ARS Human Nutrition Research Centers at Houston or San Francisco? What role do the Centers play in meeting the research needs of agencies such as FNS, HNIS, and FSIS?

Answer. Through communication and joint planning with action and regulatory agencies dealing with nutrition, ARS attempts to incorporate the research priorities of the action agencies into the program plans. In the case of FNS that is referenced, two separate statements of work are being studied by members of ARS Human Nutrition Research Centers and at this time a response is being prepared. It is anticipated that the Children's Human Nutrition Research Center at Baylor and the other from the Western Human Nutrition Research Center in San Francisco will be able to conduct this work. This particular work will be supported by funds transferred to ARS from FNS.

Much of the research conducted by the Centers is developing scientific information needed by the Agencies such as FNS, HNIS and FSIS. Many of the specific needs of these agencies are development and assimilation of specific technologies that utilize scientific information. It is unlikely that the ARS programs at the five Centers will be able to meet all the research needs of these action agencies.

2e. The ARS Six-year Implementation Plan calls for decreasing research on the nutrient content of foods. What is the rationale for this decision? How will ARS provide data for the Nutrient Data Bank if this activity is reduced by 50 percent? Was HNIS, the agency responsible for maintaining the Nutrient Data Bank, in agreement with this decision?

Answer. The Six-year Implementation Plan allocated resources on a relative priority basis. Areas of research that required further development were (1) nutrition requirements of children, pregnant women and lactating mothers, (2) nutrition requirements of the elderly, and (3) bioavailability of nutrients in foods. Since nutrient content of foods is an area that HNIS is heavily committed to and since much of the analyses can be carried out by industry, it seemed obvious that ARS should concentrate on the development of methods to carry out nutrient analyses while leaving the actual analyses to be carried out by others. This area is consistent with HNIS' responsibility and plans.

2f. Question. The Private Sector Task Force recommended the transfer of some of the USDA Human Nutrition Research Centers to DHHS because this ARS research is inconsistent with its primary mission. How do you view this recommendation and what action is planned?

Answer. The private sector task force indicated that the ARS Human Nutrition Research was heavily oriented toward clinical or disease-related research and this should be transferred to HHS. ARS does not intend to conduct disease-related research. Though human subjects are often used in the pursuit of its research, the nutrition research is directed toward determining the nutritional requirements of people at all phases of life from infancy to old age. This in fact is the proper function of USDA since the USDA is responsible for supplying adequate food and fiber to the American people. Adequate means nutritionally adequate and therefore there needs to be close communication between the producers and the nutrition scientists who study the consumer's requirements.

3a. Question. How will USDA use this system to plan research priorities for budget requests and to manage programs within each fiscal year?

Answer. The information available in the Information Management System will allow USDA program leaders quick access to all federally supported Human Nutrition Research. The Special Analysis which is carried out in order to determine the areas of research which need to be addressed will be greatly facilitated by this information. Part of USDA's planning process is to determine who is addressing which issues. In so doing USDA can then deemphasize research in areas that are adequately studied by others and emphasize research that is being neglected. This is a major factor in setting priorities for budget requests.

4a. Question. In 1981, at the time USDA reorganized human nutrition activities a new Workgroup on Human Nutrition was formed to coordinate research, education, information, and technology transfer. What specific activities has this group undertaken? Who is responsible for the progress of this group and how successful has this coordination mechanism been?

Answer. The USDA Workgroup for Human Nutrition was organized in late 1981 under the USDA Research and Education (R&E) Committee. The R&E Committee is a part of the Secretary of Agricutlure's Policy and Coordination Council. In May 1983 the USDA R&E Committee was reorganized and the Human Nutrition Work Group was designated as one of two sub-committees.

Activities undertaken by the group include (1) identification of priority issues and concerns of USDA agencies related to human nutrition (2) assistance in design of the Human Nutrition Management Information System, and (3) improved communications among the eight USDA agencies involved in human nutrition related activities.

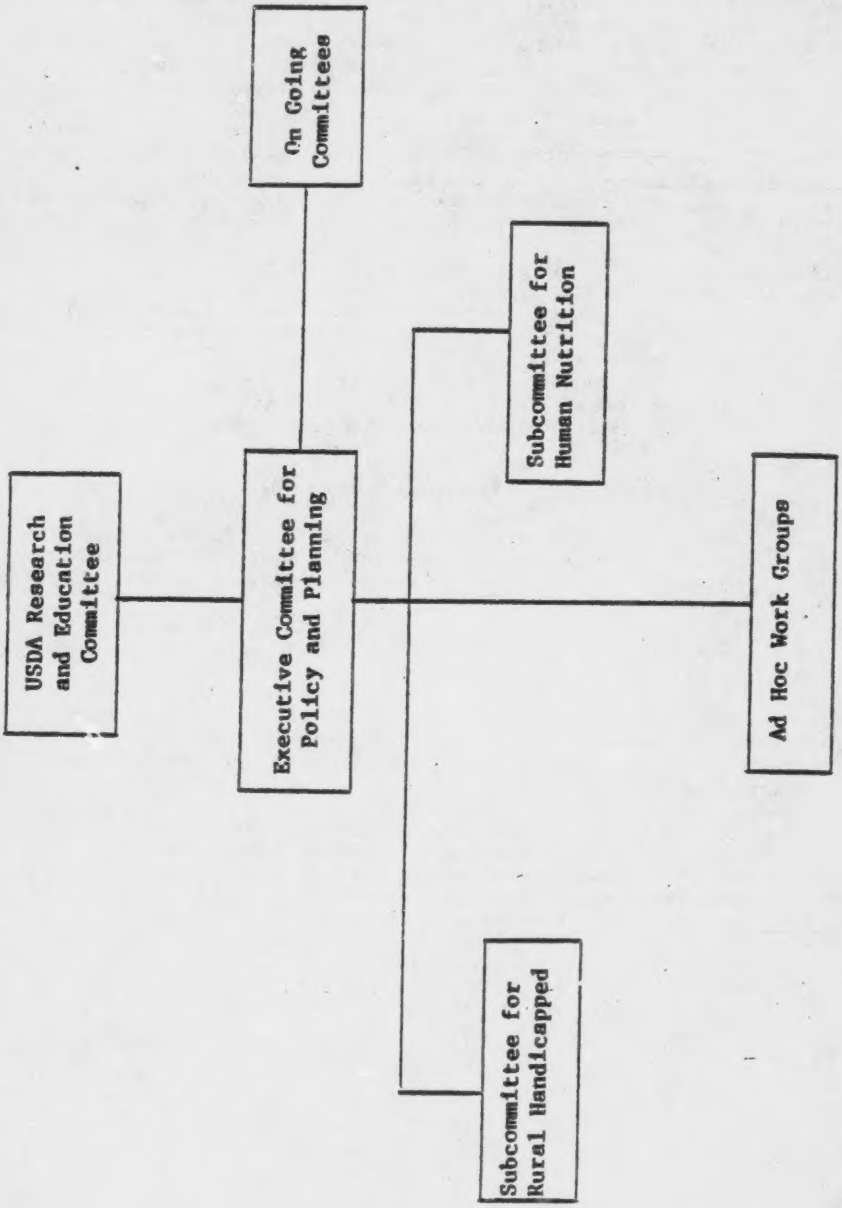
Responsibility for progress of the group has alternated between ARS and CSRS. Currently Dr. Mary E. Carter, Deputy Administrator, ARS, is Acting Chairman.

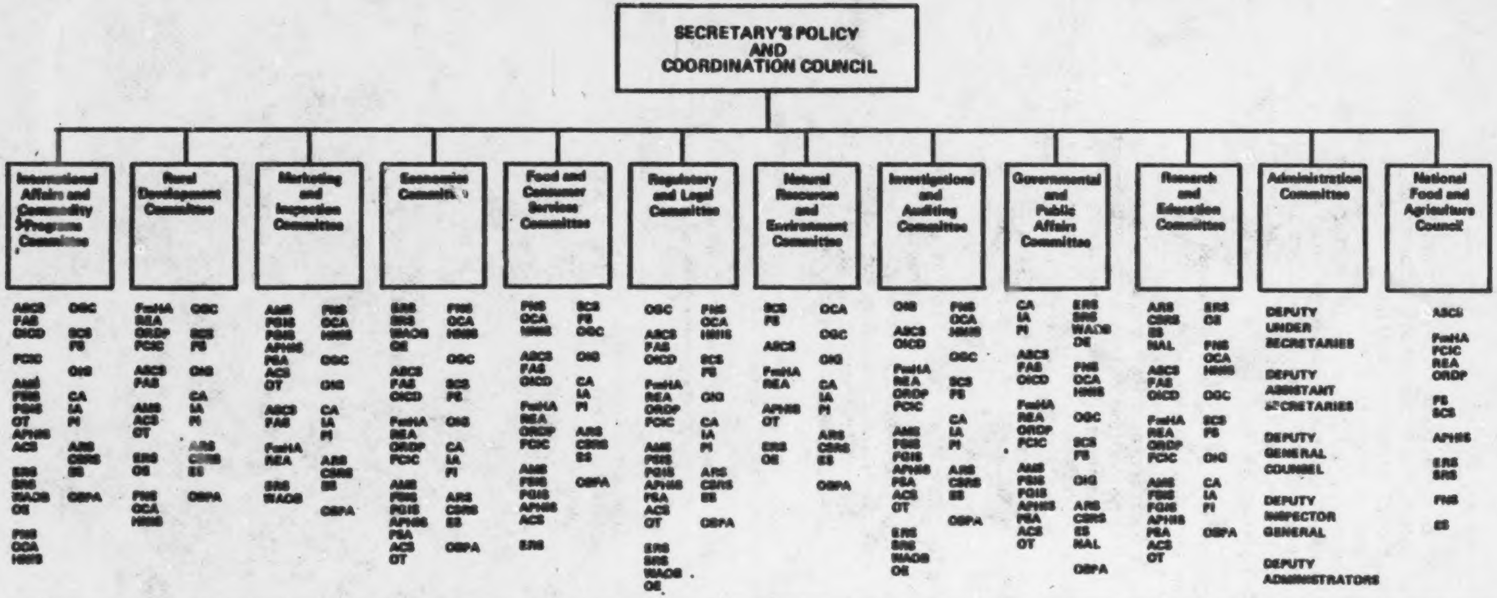
As a coordinating mechanism the group has been moderately successful.

4(b) Question. Please provide an organization chart illustrating the specific human nutrition coordination entities within the Department, the issues which each is responsible for, and designated interaction between each entity.

Answer. Organization charts are attached for the Secretary's Policy and Coordination Council and the USDA Research and Education Committee showing the relationship of the Subcommittee on Human Nutrition to these organizations. The other interagency group within the USDA related to nutrition is the Working Group on Human Nutrition Publications and Information which is a part of the Food and Consumer Services Committee of the Secretary's Council.

Agency membership on the Subcommittee and Working Group is nearly identical thus providing for communication and interactions between the groups. The Subcommittee is concerned primarily with research and education issues while the Working Group actively has been mainly in regard to the USDA's "Making Food Dollars Count" information effort.


USDA Research and Education Committee
Executive Committee for Policy and Planning
On Going Committees
Subcommittee for Human Nutrition
Subcommittee for Rural Handicapped
Ad Hoc Work Groups


SECRETARY'S POLICY AND COORDINATION COUNCIL
International Affairs and Commodity Programs Committee
ASCS FAS OICD FCIC AMS FSIS FGIS OT APHIS ACS ERS SRS WAOB OE FNS OCA HNIS
OGC SCS FS OIG CA IA PI ARS CSRS ES OBPA
Rural Development Committee
FmHA REA ORDP FCIC ASCS FAS AMS ACS OT ERS OE FNS OCA HNIS
OGC SCS FS OIG CA IA PI ARS CSRS ES OBPA
Marketing and Inspection Committee
AMS FGIS FSIS APHIS PSA ACS OT ASCS FAS FmHA REA ERS WAOB
FNS OCA HNIS OGC OIG CA IA PI ARS CSRS ES OBPA
Economics Committee
ERS SRS WAOB OE ASCS FAS OICD FmHA REA ORDP FCIC AMS FSIS FGIS APHIS PSA ACS OT
FNS OCA HNIS OGC SCS FS OIG CA IA PI ARS CSRS ES OBPA
Food and Consumer Services Committee
FNS OCA HNIS ASCS FAS OICD FmHA REA ORDP FCIC AMS FSIS FGIS APHIS ACS ERS
SCS FS OGC OIG CA IA PI ARS CSRS ES OBPA
Regulatory and Legal Committee
OGC ASCS FAS OICD FmHA REA ORDP FCIC AMS FSIS FGIS APHIS PSA ACS OT ERS SRS WAOB OE
FNS OCA HNIS SCS FS OIG CA IA PI ARS CSRS ES OBPA
Natural Resources and Environment Committee
SCS FS ASCS FmHA REA APHIS OT ERS OE
OCA OGC OIG CA IA PI ARS CSRS ES OBPA
Investigations and Auditing Committee
OIG ASCS OICD FmHA REA ORDP FCIC AMS FSIS FGIS APHIS PSA ACS OT ERS SRS WAOB OE
FNS OCA HNIS OGC SCS FS CA IA PI ARS CSRS ES OBPA
Governmental and Public Affairs Committee
CA IA PI ASCS FAS OICD FmHA REA ORDP FCIC AMS FSIS FGIS APHIS PSA ACS OT
ERS SRS WAOB OE FNS OCA HNIS OGC SCS FS OIG ARS CSRS ES NAL OBPA
Research and Education Committee
ARS CSRS ES NAL ASCS FAS OICD FmHA REA ORDP FCIC AMS FSIS FGIS APHIS PSA ACS OT
ERS OE FNS OCA HNIS OGC SCS FS OIG CA IA PI OBPA
Administration Committee
DEPUTY UNDER SECRETARIES
DEPUTY ASSISTANT SECRETARIES
DEPUTY GENERAL COUNSEL
DEPUTY INSPECTOR GENERAL
DEPUTY ADMINISTRATORS
National Food and Agriculture Council
ASCS FmHA FCIC REA ORDP FS SCS APHIS ERS SRS FNS ES

KEY

ASCS	Agricultural Stabilization and Conservation Service
FAS	Foreign Agricultural Service
OICD	Office of International Cooperation and Development
FmHA	Farmers Home Administration
REA	Rural Electrification Administration
ORDP	Office of Rural Development Policy
FCIC	Federal Crop Insurance Corporation
AMS	Agricultural Marketing Service
FSIS	Food Safety and Inspection Service
FGIS	Federal Grain Inspection Service
APHIS	Animal and Plant Health Inspection Service
PSA	Packers and Stockyards Administration
ACS	Agricultural Cooperative Service
OT	Office of Transportation
ERS	Economic Research Service
SRS	Statistical Reporting Service
WAOB	World Agricultural Outlook Board
OE	Office of Energy
FNS	Food and Nutrition Service
OCA	Office of Consumer Advisor
HNIS	Human Nutrition Information Service
OGC	Office of General Counsel
SCS	Soil Conservation Service
FS	Forest Service
OIG	Office of Inspector General
CA	Congressional Affairs
IA	Intergovernmental Affairs
PI	Public Information
ARS	Agricultural Research Service
CSRS	Cooperative State Research Service
ES	Extension Service
NAL	National Agricultural Library
OBPA	Office of Budget and Program Analysis

4. Human Nutrition Coordination and Policy

c. At the June meeting of the Institute of Food Technologists, the Administrator of USDA's Human Nutrition Information Service indicated that USDA's sodium labeling of meat and poultry products is voluntary and that FDA's proposal tying sodium labeling with nutrition labeling would differ from USDA's proposal. Why must the two departments have a different sodium labeling policy? Have the sodium labeling policies of USDA and FDA been coordinated with NOAA regarding the labeling of fish products?

It is USDA's understanding that FDA has announced its intention to propose mandatory sodium labeling of food products only if there is not a positive voluntary response from industry. FDA's position at this time is to encourage voluntary disclosure of the sodium content of food products. USDA continues to support voluntary disclosure of the sodium content of food products on label. In 1981, 31 firms were providing sodium content on 1600 labels of products regulated by USDA. In 1983, 111 firms were voluntarily providing sodium content information on 3500 labels of products regulated by USDA.

d. The House Appropriations Committee report for FY 84 directs the Administrator of the Human Nutrition Information Service (HNIS) "to be responsible for seeing to it that all agencies in this bill speak with one voice in issuing nutritional guidance." How do you plan to implement this in view of the fact that the bill includes FDA which is a part of DHHS?

The directive of the House Appropriations Committee report can be best implemented by continued close coordination of nutrition education programs of DHHS and USDA . USDA and DHHS work closely on a number of nutrition information and food safety areas. Evidence of recent cooperative efforts that resulted in or will result in nutrition guidance include: (1) the USDA/DHHS Maternal and Infant Teleconference in April 1983; (2) the joint sodium awareness campaign; (3) the issuance of a joint USDA/DHHS letter with the individual departmental responses of the National Academy of Sciences Diet, Nutrition and Cancer Report of June 1982; (4) USDA and DHHS participation in the Dietary Guidelines Review Committee activity.

The Assistant Secretaries for Health (DHHS) and Food and Consumer Services (USDA) hold regular meetings on issues of mutual concern. Their staff and agency personnel interact on matters related to nutrition guidance both through formal committee activity and informed consultation.

5. Research Priorities, Funding and Mission

a. Last June the Department indicated a review of the NAS Diet, Nutrition, and Cancer Report was underway and the review could be used to guide relevant research prior to receiving the June 1983 supplement on Directions for Research. How was the review integrated into USDA research planning activities for FY 84 and FY 85?

This is an S&E response. We have one addition. HNIS is planning to propose funding for a study on the selenium content of foods to be contracted in FY 85.

5a. Question. Last June the Department indicated a review of the NAS Diet, Nutrition, and Cancer report was underway and the review could be used to guide relevant research prior to receiving the June 1983 supplement on Directions for Research. How was the review integrated into USDA research planning activities for FY 84 and FY 85?

Answer. Since development of research activities for FY 1984 took place well in advance of the July 1983 release of the review, it was not possible to consider the review in the FY 84 plans. Appropriate consideration of the review will be given in the development of FY 1985 research activities through the mechanism of the USDA Work Group for Human Nutrition.

5b. Question. What Department-wide planning mechanisms are used to determine human nutrition research priorities and to allocate funds among CSRS, ARS, HNIS, OG and other agencies such as FSIS?

Answer. The primary mechanism used to determine human nutrition research priorities is the Human Nutrition Work Group which is one of two subcommittees of the USDA Research and Education Committee, part of the Secretary of Agriculture's Policy and Coordination Council. The priorities identified by this group of representatives from eight USDA agencies, including FSIS, are given appropriate consideration in the planning activities of the individual agencies and followed by oversite responsibility within the USDA's Office of Budget and Program Analysis.

6. National Nutrition Monitoring System

a. Since the Evaluation Committee of the Nutrition Status Monitoring System has not meet, when can Congress expect to receive the report on the nutritional status of the population originally scheduled for FY 84?

With the recent approval of the Charter for the Evaluation Committee, we hope to have the initial meeting of the Committee as soon as their schedules will permit. Until there is a meeting of the committee, it is not possible to set a date as to when Congress will receive a report from this committee. However, if possible, we would hope to have an interim report by the end of FY-84.

b. What is the probability of beginning the first coordinated National Nutrition Monitoring System surveys in 1987 as called for in the Implementation Plan? When will the interlocking survey design be completed?

It is still USDA's plan to conduct with DHHS, the first coordinated NNMS survey in 1987. This will, however, depend on funding in FY-1985 to pretest the household phase of the survey and funding in FY 1986 for contracting USDA's part of the NNMS survey to be initiated in 1987. The Department has been working with the Department of Health and Human Services for more than a year to make NFCS and NHANES more compariable than is now attainable. Final designs will be completed in FY-84.

c. What impact will the FY 83 and FY 84 budgets for HNIS have on the Department's ability to conduct the first coordinated survey in 1987? What impact will the FY 84 budget for HNIS have on the longitudinal dietary survey to be conducted in FY 84-85?

HNIS's FY-83 and FY-84 budgets will not have any major impact on the Department's ability to conduct the first coordinated survey in 1987. The FY-1984 budget for HNIS, however, will materially affect the longitudinal dietary survey that will be contracted for in FY-1984 and initiated in 1985. Due to budget limitations, the Department will be able to initiate the survey on only a monitoring group, probably women 22-50, and possibly children of those women. Due to reduced sample size, data will not be available for the four regions of the country separately and will be available for no more than two income classes.

MISSION AND RESEARCH ACCOMPLISHMENTS IN HUMAN NUTRITION PROGRAM

AGRICULTURAL RESEARCH SERVICE
UNITED STATES DEPARTMENT OF AGRICULTURE

DECEMBER 1982

FOREWORD

The Food and Agriculture Act of 1977 authorized new initiatives in human nutrition research (PL 95-113, September 19, 1977). A portion of the statutory authorities that underpin the food and nutrition activities of the U.S. Department of Agriculture (USDA) follows:

- "New Federal initiatives are needed in the area of research and extension on human nutrition and food consumption patterns in order to improve the health and vitality of the people of the U.S." Section 1402(8)(B).
- "... the Secretary shall develop and implement a national food and human nutrition research and extension program that shall include research on human nutritional requirements." Section 1422(1).

In response to the mandate of Congress, a separate human nutrition research program was established within the former Science and Education Administration (SEA) in January 1978. At that time, SEA consisted of the offices of Human Nutrition Center, Agricultural Research, Cooperative Research, Extension, Higher Education, and Technical Information Systems. In the 1981 reorganization, SEA was abolished and Science and Education was created, and the functions performed by the Administrator of the Human Nutrition Center were transferred to the Administrator of the Agricultural Research Service (ARS), which was reestablished as an agency in the reorganization. Initially, this research program built on existing human nutrition research conducted in the pre-1981 ARS. However, significant new program areas and thrusts were planned in response to (1) the overall congressional mandate; (2) additional and more specific congressional mandates; (3) USDA human nutrition responsibilities identified by a special Interagency Task Force composed of multiple Federal agencies and cochaired by SEA and the National Institutes of Health; and (4) the requirements of a sound and comprehensive research program on human nutritional requirements at all stages of life, from infancy to old age. Those program areas and their associated locations are:

- Children's Nutrition Research Center at Baylor College of Medicine, Houston, Texas. Established in 1979, in response to congressional mandate, the Children's Nutrition Research Center is the only research center in the country that is dedicated to scientific study of the nutritional needs of pregnant and lactating women and of infants and children. Its mission is to define the nutritional requirements that will ensure optimal nutritional status in pregnant and lactating women and in children from their conception through their adolescence.
- Beltsville Human Nutrition Research Center, Beltsville, Maryland. The history of the Beltsville Human Nutrition Research Center can be traced to 1894, when Congress authorized the Office of Experimental Status, with headquarters at Wesleyan University in Middletown, CT, to carry out human-nutrition investigations. The headquarters was moved to Washington, DC in 1906, and to Beltsville, MD, in 1941. The mission of the center is to define human requirements for the essential nutrients-protein, carbohydrate, lipids, vitamins and minerals - for optimal health, and to identify, through study of their nutrient composition, the foods that meet those nutritional requirements.

- Grand Forks Human Nutrition Research Center, Grand Forks, North Dakota. The Grand Forks Human Nutrition Research Center was originally part of the pre-1981 ARS human nutrition research effort. It was established due to the recommendation for its establishment in a report prepared by ARS, in 1963, on needs for human-nutrition research in USDA. Its mission is to develop recommendations for nutrient intakes in humans and to identify useful nutrient forms, with particular emphasis on mineral requirements. Although the main thrust of research is directed toward the role of trace elements in nutrition, other essential nutrients (e.g., protein, carbohydrate, and fat) are not overlooked. Those nutrients are studied in collaboration with several other scientists at various universities and at other ARS locations.

- Human Nutrition Research Center on Aging at Tufts University, Boston, Massachusetts. In response to the mandate of Congress, the Human Nutrition Research Center on Aging was established in FY 1980. Its mission is to determine the nutrient needs of the elderly and the relationship of dietary factors to the aging process. Investigations are carried out to determine the influence of diet on the onset and course of aging and the manner in which diet can delay or prevent the onset of degenerative diseases associated with aging.

- Western Human Nutrition Research Center, the Presidio of San Francisco, California. The Western Human Nutrition Research Center was established when Congress ordered the transfer of the nutrition research program of the Army, located at Letterman Army Institute of Research, Presidio of San Francisco, to the USDA. The transfer, which included 19 positions became effective on April 6, 1980. The metabolic nutrition unit and associated facilities, laboratory, and necessary office space were also to be provided by the Army.

  In response to the congressional mandate, the missions of the center are to improve methods for assessing human nutritional status and to study human nutritional rquirements and the factors that lead to malnutrition.

- Consumer Nutrition Center, Hyattsville, Maryland. The Consumer Nutrition Center was established by an act of Congress, in 1935, to conduct research on food consumption, dietary levels of nutrients, and nutrition education. To accomplish this research the Center conducts a nationwide food-consumption survey at 10-year intervals. The survey is based on a nationwide sampling of individuals and households and on a supplemental sampling of elderly and low-income people. The primary objectives of the survey are to measure the nutritional quality of U.S. diets, changes in diets, and factors related to these changes. The data from the survey are used throughout Government and private industry to project food consumption and demand.

  The Consumer Nutrition Center and its functions were transferred to the Human Nutrition Information Service, Food and Consumer Service, in the 1981 reorganization of SEA.

The research workers in the human nutrition program publish their findings in the open literature. For those interested in human nutrition research, however, this annual report gives a brief overview of the activities and recent findings, some of which have not been released for publication in scientific journals. The report describes the national research programs carried out at each center.

Readers who have comments or inquiries are invited to contact either the National Program Staff or, more appropriately, scientists at the locations where the research is conducted.

DONALD G. THERRIAULT
National Research Program Leader

HUMAN NUTRITION RESEARCH CENTER
ADDRESSES AND PRINCIPAL CONTACTS

- Human Nutrition Research Center on Aging at Tufts University

USDA, ARS
Tufts University
15 Kneeland Street
Boston, Massachusetts 02111

Comm: 617-956-7570
FTS: 8-617-956-7570

Hamish Munro, Center Director

- Beltsville Human Nutrition Research Center

USDA, ARS
Bldg. 308E, Room 223, BARC-East
Beltsville, Maryland 20705

Comm: 301-344-2157
FTS: 8-301-344-2157

Walter Mertz, Center Director

- Grand Forks Human Nutrition Research Center

USDA, ARS
P. O. Box 7166, University Station
Grand Forks, North Dakota 58202

Comm: 701-783-6353
FTS: 8-783-0353

Harold Sandstead, Center Director

- Children's Nutrition Research Center at Baylor College of Medicine

USDA, ARS
Department of Pediatrics
Baylor College of Medicine
6608 Fannin Avenue
Houston, Texas 77030

Comm: 713-790-6006
FTS: 8-713-790-6006

Buford L. Nichols, Scientific Director

- Western Human Nutrition Research Center

  USDA, ARS
  Bldg. 110, Room LR-3142-LAIR
  Presidio of San Francisco
  California 94129

  Comm: 415-556-9699
  FTS: 8-415-556-9699

  James M. Iacono, Center Director

- Consumer Nutrition Center

  USDA, ARS
  Federal Building, Room 368
  6525 Belcrest Road
  Hyattsville, Maryland 20782

  Comm: 301-436-8457
  FTS: 8-436-8457

  Robert L. Rizek, Center Director

TABLE OF CONTENTS

Page

Summary v

NRP 20900 Food Composition and Improvement

T01 Provide accurate, up-to-date, and comprehensive information in a readily usable form, on the nutrients in all important foods that are required by and biologically useful to man 1

NRP 20910 Human Requirements for Nutrients

T01 Determine the requirements for lipid intake, and identify the chemical forms of the nutrients in foods that would be most useful in meeting those requirements 4

T02 Determine the requirements for mineral intake by humans and identify the chemical forms of the nutrients in foods that would be most useful in meeting those requirements 6

T03 Determine the requirements for vitamin intake by humans and identify the chemical forms of the nutrients in foods that would be most useful in meeting those requirements 13

T04 Determine the requirements for protein and amino acid intake by humans and identify the chemical forms of the nutrients in foods that would be most useful in meeting those requirements 15

T05 Determine the requirements for carbohydrate and energy intake by humans and identify the chemical forms of the nutrients in foods that would be most useful in meeting those requirements 19

NRP 20920 Food Consumption and Use

T01 Provide accurate, up-to-date, and comprehensive information, in a readily usable form, on food consumption and dietary levels 22

T02 Provide consultative assistance on food and nutrition problems and provide sound guidance materials on nutrition for consumers and for nutrition educators, program leaders, and food program managers (a) to identify techniques that will assist people in selecting nutritionally 23

Page

adequate diets within different budget limitations, (b) to identify means for modifying undesirable food habits, and (c) to strengthen nutritionally desirable food choices 23

T03 Identify and develop suitable and safe procedures for the management and preparation of food, for home and institutional consumers, that will provide for the best retention of both nutritional and eating qualities and help avoid food-borne illness 24

SUMMARY

Human nutrition research is an important part of the Federal research efforts. Human nutrition studies include research to define nutritionally adequate diets, to evaluate the nutritional status of individuals and the population, and to interpret the findings for the public.

The research is conducted under three National Research Programs (NRP's) that constitute USDA's mission in food and nutrition. The programs that deal with food composition and improvement are in NRP 20900; with human requirements for nutrients in NRP 20910; and with food consumption and use in NRP 20920.

Selected examples of recent accomplishments under each NRP are summarized as follows:

NRP 20900 Food composition and Improvement

The research covered by this NRP is conducted at the Beltsville Human Nutrition Research Center and the Consumer Nutrition Center in Hyattsville by 23 scientists. They published eight reports and/or articles during this reporting period.

More than 50 fast-food items that were obtained from three chains in the Washington, D. C. area were analyzed for lipid content. Publication of the resulting data provided the most extensive research listing to date of lipid components in fast foods. The analyses of ready-to-eat breakfast cereals revealed that the neutral detergent fiber content ranged from 0% to 31% of the dry weight and that the vitabmin B_6 content ranged from 0.2 to 3.05 mg/oz.

Two sections of Agriculture Handbook No. 8 - section No. 8-8, "Breakfast Cereals"; and section No. 8-9, "Fruits and Fruit Juices", were revised and submitted for printing. In addition, the provisional tables "Nutrient Content of Bakery Foods and Related Items" and "Iron Content of Foods" were completed and distributed.

NRP 20910 Human Requirements for Nutrients

Four research centers and a total of 59 scientists are engaged in research covered by this NRP. The centers are the Beltsville Human Nutrition Research Center, Grand Forks Human Nutrition Research Center, Children's Nutrition Research Center at Baylor College of Medicine, and the Human Nutrition Research Center on Aging at Tufts University. The scientists at the four centers have published a total of 59 reports and/or articles during this reporting period.

The effectiveness of diet control and of increases in physicl activity on weight control and on the metabolic parameters that are associated with disease states was investigated with obese boys. Attention was focused on changes in diet and exercise that would enhance long-term compliance rather than on changes that would dramatically reduce body weight in a short time. A decreased intake of 600 Kcal per day (mainly in sugar or high-fat snack foods or both) and light exercise for 31 weeks was sufficient to stop weight gain and normalize key metabolic indicators.

Breast milk alone, even from mothers whose vitamin B_6 intake was more than double the recommended dietary allowance (RDA) provided only about 50% of the RDA for vitamin B_6 to infants. This research suggested that the RDA for vitamin B_6 for infants 1-6 months old should be reexamined to determine whether it is too high.

Human milk has been identified as the ideal nutrient source for infants. Women from middle- and upper-income groups were found much more likely to breast-feed their infants that were their low-income counterparts. Data also demonstrated that many low-income women who chose to breast-feed discontinued that form of feeding during the first month. Preliminary evidence indicated that support services for prenatal, in-hospital, and post-partum breast-feeding can significantly improve the success rate of breast-feeding among this population during the first 30 days post-partum.

A new method was developed for studying abundance of messenger RNA's for specific proteins. The method can be used to study the effects of aging and nutrition on adaptive changes in protein synthesis in certain models that involve changes in messenger abundance, namely cold adaptation and ferritin protein synthesis after iron administration. The latter was extensively explored, and iron was shown to favor synthesis of the light subunits of the ferritin shell. Those subunits appear to carry the oxidation site necessary for iron storage.

Earlier findings have revealed that (1) muscle mass decreases in the bodies of older people; (2) the rate of albumin formation is controlled at a lower set point in adults than in the young, and (3) whole-body protein and amino acid metabolism are redistributed with muscle contributing less to whole-body protein turnover in the elderly than in young adults. During 1981, studies on whole-body leucine metabolism examined while subjects were in the postabsorptive state revealed no major differences in that metabolism between young adult and elderly subjects. Finally, it was shown that the rate at which muscle protein breaks down is controlled by diet and hormones. Picolinic acid, a product of tryptophan metabolism, was shown to facilitate the absorption of zinc in rats and humans.

Mild zinc and copper deficiencies were produced in normal volunteers who were fed diets prepared from conventional foods. The levels of zinc and copper fed were in the range that are believed to be consumed by a segment of the U.S. population. In both instances, subtle metabolic abnormalities occurred. Findings of particular interest in volunteers depleted of zinc were increased urinary catecholamines and increased utilization of fat for energy. Findings of interest in volunteers depleted of copper were an increase in serum cholesterol and in increased occurrence of sudden change in heart rate.

NRP 20920 Food Consumption and Use

The research under this NRP is conducted by the Consumer Nutrition Center in Hyattsville, MD. The 35 scientists at this center published 22 reports and/or articles during this reporting period.

In cooperation with FAO, Data Bank processing and final review of data for the Near East food composition table were completed. Initial work was initiated with FAO on a Latin American Food composition table.

The individual components of the Nationwide Food Consumption Survey (NFCS) were analyzed in depth for two population groups--children and the elderly. Three research papers were presented, and two additional papers were accepted for presentation early in FY 1982.

Basic research required for revision of the USDA food plans at four cost levels was continued both intramurally and extramurally. Testimony on the thrifty food plan was given before two congressional committees.

National Research Program 20900

FOOD COMPOSITION AND IMPROVEMENT

Technological Objective 1: Provide accurate, up-to-date, and comprehensive information, in a readily usable form, on the nutrients in all important foods that are required by and biologically useful to man.

The purpose of this program is to (1) develop data on a spectrum of nutrients not presently tabulated in Agriculture Handbook (AH) No. 8, as well as data on food items presently tabulated for which new nutrient analyses are clearly needed; (2) provide additional data on nutrients not presently included in the tables but for which dietary recommendations are being made; (3) prepare a successor publication to AH No. 8, with revised values representing current practices and covering many new foods (and with some food items deleted as no longer important); it will have tables dealing with lipid constituents and most of the nutrients included in the Recommended Dietary Allowances proposed by the Natinal Research Council of the National Academy of Sciences, and (4) incorporate, into the computerized National Nutrient Data BAnk, extensive additional information on essential trace minerals, vitamins, certain amino acids, lipid constituents, and various carbohydrate constituents in food.

NPS Contact: J. M. Iacono

Research Locations:

Beltsville, MD
Hyattsville, MD

Examples of Recent Progress:

Lipid content of 50 fast-food items determined - Beltsville, MD. Data was obtained on the lipid content of more than 50 fast-food items from three chains in the Washington, D. C. area. This research listing is the most extensive one on the lipid content of fast foods that has ever been published.

Fiber content of 81 ready-to-eat breakfast cereals determined - Beltsville, MD. The fiber content of 81 ready-to-eat breakfast cereals was determined. The neutral detergent fiber content of the cereals tested ranged from 0% to 31% of the dry weight of the cereals.

Sugar content of 14 granola cereals determined - Beltsville, MD. The sugar content of 14 granola cereals from seven manufacturers was determined. The sugar content ranged from 22% to 32% of the dry weight.

Vitamin B_6 content of 24 ready-to-eat breakfast cereals determined - Beltsville, Md. The vitamin B_6 content of 24 ready-to-eat breakfast cereals was determined. The range was from 0.2 to 3.05 mg of vitamin B_6 per ounce of cereal. In one-third of the cereal brands tested, the vitamin B_6 content varied appreciably among lots.

Agriculture Handbook No. 8 revised - Hyattsville, MD. Two sections of AH No. 8 were revised and ready for printing in FY 1981: Section No. 8-8, "Breakfast Cereals," and Section 8-9, "Fruits and Fruit Juices." Breakfast cereals were identified by brand names, and values were based primarily on data provided by industry.

Provisional tables of special interest issued - Hyattsville, MD. A provisional table entitled "Nutrient Content of Bakery Foods and Related Items" was prepared for distribution by the Nutrient Data Research Group to persons who request up-to-date information on those foods. Values based mostly on data from industry are presented for many new baked foods that are not listed in AH No. 8. The provisional table "Iron Content of Food" was prepared and used as a model for developing methods of expressing relative confidence levels of the data.

PUBLICATIONS

Beltsville, Maryland

Baker, D. 1981. Notes on the neutral detergent fiber method. Chapter 9 in "The Analysis of Dietary Fiber in Food." Edited by W. P. T. James and O. Theander. Marcel Dekker, Inc., New York. pp. 159-162.

Baker, D. and J. M. Holden. 1981. Fiber in breakfast cereals. J. Food Sci., 46(2):396-398.

Cross, H. R., M. K. Moss, K. Ono, I. Tennet, H. T. Slover, W. Wolf, R. Thompson, E. Lanza and K. Stewart. 1981. Sampling fresh pork for nutrient analysis. J. Food Sci. 46:1007-1009.

Harnly, J. M. and T. C. O'Haver. 1981. Extension of analytical curves in atomic absorption spectrometry. Anal. Chem. 53:1252-1257.

Lanza, E. and H. T. Slover. 1981. The use of SP2340 glass capillary columns for the estimation of the trans fatty acid content of foods. Lipids 16:260-267.

Li, B. W. and P. J. Schuhmann. Gas chromotographic analysis of sugars in granola cereals. J. Food Sci. 46(2):425-427.

Hyattsville, Maryland

Haytowitz, D. B., A. C. March, and R. H. Matthews. 1981. Content of selected nutrients in raw, cooked, and processed legumes. Food Technol. 35(3):73-74.

McQuilkin, C. and R. H. Matthews. 1981. Provisional table "nutrient content of bakery foods and related items."

National Research Program 20910

HUMAN REQUIREMENTS FOR NUTRIENTS

Technological Objective 1: Determine the requirements for lipid intake, and identify the chemical forms of the nutrients in foods that would be most useful in meeting those requirements.

The purposes of this program are to (1) establish the relationship of essential fatty acid intake and prostaglandin metabolism needs to enable development of an RDA for linoleic or arachidonic acid; (2) develop a firm base for recommending maximum levels to which food fat in the diet should be restricted to minimize or avoid elevated serum cholesterol levels, elevated blood pressure, or tendency toward blood clotting in adult populations; (3) develop data on the physiological consequences when dietary lipid sources contain isomerized unsaturated fatty acids for use in planning improved technology for hydrogenating or processing food fats; and (4) determine the effect of dietary minerals such as calcium and trace minerals on digestion, absorption, and metabolism of dietary fat as the basis for improving diet counseling when lipid metabolism is involved.

NPS Contact: J. M. Iacono

Research Locations: Beltsville, MD
Houston, TX

Examples of Recent Progress:

Essential fatty acid intake related to prostaglandin metabolism and function - Beltsville, Maryland. The effects of variations in types of dietary fatty acids on the development of hypertension and prostaglandin metabolism were studied in genetic animal models of hypertension. The essential fatty acid, 18:2n-6, is the precursor of arachidonic acid (20:4n-6), the "natural" substrate for the enzymes that produce the many eicosanoids with such diverse biological activities.

The results from these in vitro experiments suggested that alterations in the pools of 20:4n-6 by dietary means may produce a change in the metabolism of prostaglandins that arise from 20:4n-6.

In situ biosynthesis of prostaglandins demonstrated - Houston, Texas. Investigations on lactation and on the cytoprotective effect of prostaglandins on the gastrointestinal tract are being conducted: (1) prostaglandin biosynthesis and catabolism by the rabbit mammary gland were examined in vitro by the use of arachidonic-1-^{14}C-acid, prostaglandin-1-^{14}C-endoperoxide (for biosynthesis), and ^{3}H-prostaglandin $F_{2\alpha}$ (for catabolism); (2) transfer of labeled prostaglandins from the circulation system of lactating rabbits to their milk was examined; (3) the content of prostaglandins, thromboxanes, and prostacyclin in human milk obtained during a 24-hour period was investigated; and (4) the model of necrotizing enterocolitis in artificially fed newborn rats was demonstrated successfully. The cytoprotective effect of prostaglandins on the gastrointestinal tract is being investigated.

The significances of these studies are: (1) the demonstration of in situ biosynthesis of prostaglandins, thromboxanes, and prostacyclin and the catabolism of prostaglandins by the mammary gland; (2) the transfer of prostaglandins from the maternal circulation system to the milk seems to be of less value than the de novo synthesis of prostaglandins by the mammary gland; and (3) the confirmation of a suitable animal model with necrotizing enterocolitis.

Technological Objective 2: Determine the requirements for mineral intake by humans and identify the chemical forms of the nutrients in foods that would be most useful in meeting those requirements.

The purpose of this program is to (1) provide data needed to develop an RDA for copper and chromium; (2) establish the essentiality to man of two or three additional trace metals (selenium, nickel, vanadium, and manganese are currently under study); (3) develop a firm base for diet recommendations for zinc, calcium, and magnesium for certain age-sex groups for which the limited data require extrapolation or inferences from research on other populatin groups; (4) quantitate the role of other nutrients in altering human needs for calcium and magnesium, and determine the physiological consequences of a less-than-optimum dietary intake; and (5) provide needed data on the chemical forms of iron, zinc, copper, and chromium that are biologically effective.

NPS Contact: J. M. Iacono

Research Locations: Beltsville, MD
Grand Forks, ND
Houston, TX

Examples of Recent Progress:

Zinc supplementation found needed by pregnant women - Beltsville, Maryland. Hispanic women (108) were randomly assigned to a treatment of 20 mg of zinc and a prenatal vitamin and mineral capsule. A control group (n=106) received only the vitamin and mineral capsule. Final serum zinc levels and zinc supplementation were significantly correlated. The correlation was most pronounced among women (n=45) who took the most capsules. Infant body weights were correlated with the use of supplements containing zinc. No relationship was found between maternal hair and serum zinc concentrations or between maternal hair and zinc supplementation. Calculated 24-hour dietary zinc intake was less than 50% of the RDA. Results of this study indicated that pregnant women with marginal zinc nutriture need zinc supplementation.

Zinc deficiency caused testicular damage in the rat - Beltsville, Maryland. Testicular damage associated with zinc deficiency in prepubertal and postpubertal rats was studied. The data suggested that a prepubertal, short-term zinc deficiency causes degenerative changes that can be repaired by zinc repletion. In contrast, the degenerative changes of the testes of postpubertal, zinc-deficient rats were not reversible. If the data are relevant to humans, some types of testicular atrophy may be associated with inadequate zinc nutriture.

Glucose depressed phosphate transport in the everted gut sac - Beltsville, Maryland. In studies of intestinal phosphate-transport mechanisms in the rat, the flux of both phosphate ions and water was measured in everted gut sacs instead of measuring radioactive phosphate, the conventional method. This new approach demonstrated that in addition to its uptake of phosphate, the intestinal tissue spontaniously secretes a significant amount of phosphate during the assay. The overall flux of phosphate was dependent on the concentration of phosphate in the incubation medium and on the presence of various carbohydrates. Specifically, glucose apparently depressed phosphate transport without inhibiting spontaneous secretion, thereby resulting in reduced efficiency in the net transport of phosphate.

Mineral and protein interactions influenced dietary requirements for zinc, copper, iron, calcium, and magnesium - Grand Forks, North Dakota. Balance studies were conducted with about 40 volunteers who were fed mixed, U.S. diets that provided about 8% or 15% of energy from protein and that contained various souces of dietary fiber. Multiple stepwise regression analysis of the data revealed previously unrecognized interactions that influence and can be used to predict dietary requirements for zinc, copper, iron, calcium, and magnesium.

Predictors tested for element requirements were as follows: (1) for zinc (Zn)--Zn balance; calcium (Ca), phosphorus (P), and nitrogen (N) intakes; and interactions among the predictors; (2) for copper (Cu)--Cu balance; Zn, P and N intakes; and interactions among the predictors; for iron (Fe), Ca and magnesium (Mg)--balance of the element; intakes of N and P; and the interactions among the predictors. On the basis of the data, requirements for Zn, Cu, Ca, and Mg can be calculated in relation to the dietary content of the major predictors.

Mild zinc deficiency produced in human subjects - Grand Forks, North Dakota. Volunteers were fed mixed diets providing 3.0-3.8 mg of zinc daily for about 16 weeks after a control period of 5 weeks, followed by a rehabilitation period of 3-5 weeks. The plasma zinc trend was downward, but the lowest levels did not reach the range generally considered abnormal. The subjects retained zinc during the first 8 weeks of depletion. Then their zinc losses progressively increased until they were in negative balance by the end of depletion. Balances of calcium, magnesium, phosphorus and copper were not affected. Urinary catecholamines increased markedly in dopamine and norepinephrine excretion during the first half of zinc depletion and the first few days of repletion. Indices of riboflavin and folate status were abnormal during depletion, but recovered with repletion. Acuity of taste and adaptation to darkness were not adversely affected.

The bioavailablility of zinc from cereals made from corn intrinsically labeled with ^{65}Zn determined - Grand Forks, North Dakota. Volunteers were fed unbrowned corn grits and corn flakes intrinsically labeled with ^{65}Zn in an experiment to determine the effects of browning (Maillard reaction) on the bioavailability of zinc. The corn was labeled at the ARS Plant Metabolism Laboratory in Fargo, ND. The corn grits and corn flakes were prepared at the Northern Regional Research Center, Peoria, Illinois. Preliminary results indicated that similar amounts (40-50%) of zinc are absorbed from both cereals but that when corn flakes are fed, up to 35% of the absorbed zinc is rapidly excreted and has a biological half-life of 5-12 days. Thus, the net amount of zinc available for utilization was substantially greater when volunteers were fed unbrowned corn grits than when they were fed corn flakes.

Effect of dietary copper on response of rats to dietary cholesterol and cholic acid determined - Grand Forks, North Dakota. In rats, the hypercholesterolemia caused by dietary cholesterol and cholic acid was decreased by the addition of copper to chow. When the doses of cholesterol and cholic acid were decreased, the hypercholesterolemia was eliminated by dietary copper. This experiment forges a link between the hypothesis that lipids induce atherosclerosis and the hypothesis that copper is involved in the etiology of ischemic heart disease. Dietary cholesterol and cholic acid may increase the copper requirement.

Copper deficiency produced cardiac abnormalities in rats - Grand Forks, North Dakota. Among 40 rats made deficient in copper, 16 developed ventricular aneurysm, 9 had hemathorax, 7 had plural effusion, 3 had cardiac rupture, and 2 had hemopericardium. Fourteen rats had none of those abnormalities and some had more than one abnormality. The abnormalities that developed are similar to those commonly found in people who die of ischemic heart disease.

ffects of dietary iron on iron-zinc interaction determined - Grand Forks, North akota. True daily zinc absorption was determined in rats fed a diet high in iron (220 ppm Fe; 16.5 ppm Zn), one with adequate iron (30 ppm Fe) and one high n iron with varying levels of vitamin B_6 or a constant level of picolinic acid (200 ppm). Zinc absorption in rats fed the diet high in iron was ignificantly less than that in rats fed the diet with adequate iron. Zinc bsorption in rats fed the diet high in iron, with supplemental picolinic acid, was markedly increased and did not differ from that in rats fed the diet with adequate iron. Zinc absorption increased as the level of dietary vitamin B_6 was increased. The concentration of picolinic acid in the pancreas also ncreased as the level of dietary vitamin B_6 was increased. The results suggested that a high level of dietary iron inhibited zinc absorption, in part y competing, for binding, with endogenous picolinic acid.

Assay for picolinic acid in plasma developed - Grand Forks, North Dakota. By the use of this assay picolinic acid (PA) was quantitated in plasma from normal human subjects and volunteer subjects fed varying levels of tryptophan. The concentration or picolinic acid in humans generally ranges from 9.5 to 15 µmol. Volunteers fed 210 mg of tryptophan daily had a plasma PA concentration of 13.5 µmol. When the daily tryptophan intake of these volunteers was increased 600 mg/day, the plasma PA concentration increased to 30-50 µmol. The effect of this increase on zinc balance has not, as yet, been determined.

Effect of picolinic acid on absorption of zinc by body organs demonstrated - Grand Forks, North Dakota. One group of rats was injected with 100 µg^{65}Zn-histidine, and another group of rats was injected with 100 µg^{65}Zn dipicolinate. The results suggested that zinc dipicolinate is absorbed by rapidly proliferating tissue or tissues involved in zinc absorption, but zinc histidine is taken up by the organs involved in excretion.

Addition of zinc dipicolinate to diets of lactating rats promoted zinc transfer to fetus and lactating pups - Grand Forks, North Dakota. During the last week of pregnancy and for 1 week after delivery, female rats were fed diets that contained either zinc acetate or zinc dipicolinate. The liver and kidneys of the pups from females given zinc dipiolinate contained a significantly greater concentration of zinc than did those of pups from females fed zinc acetate. The results suggested that the feeding of zinc dipicolinate to female rats promotes more rapid transfer of zinc to the fetus and lactating pups than does zinc acetate.

Antagonistic interaction between nickel and copper confirmed - Grand Forks, North Dakota. The antagonistic interaction between nickel and copper in rats was confirmed. If copper, or copper plus iron, deprivation was not too severe, or was too mild, signs of copper deficiency were more severe with than without nickel, and that effect was greater when dietary nickel was 50 µg/g than when it was 5 µg/g. Nickel supplementation did not significantly depress the level of copper in liver or plasma of copper-deficient rats. This finding indicated that nickel did not exacerbate copper deficiency signs by interfering with copper absorption. It also supported the suggestion that nickel substitutes for copper at some functional sites. Iron deprivation probably did not influence the interaction between nickel and copper by interfering with copper absorption because, when dietary copper was adequate, iron deprivation elevated the level of copper in liver. Preliminary findings indicated that iron deprivation elevated the level of nickel in some tissues. Thus, iron deprivation may have had an effect on copper deficiency similar to that from elevation of dietary nickel.

Arsenic deprivation produced nutritional deficiencies in the rat - Grand Forks, North Dakota. Successive generations of rats were used in tests of arsenic deprivation so that they would be exposed to deprivation throughout fetal, neonatal and adult life. Fetal mortality was greater with arsenic deprivation than without. Arsenic-deprived pups exhibited depressed growth, hematocrits, and hemoglobins, as well as elevated plasma urea, plasma alkaline-phosphatase activity, and liver content of copper and manganese. Preliminary findings also indicated that arsenic deprivation depressed brain weights, depressed the synthesis of plasma triglycerides and of hepatic phosphatidyl choline, and elevated the activity of plasma glutamate-pyruvate transaminase. The data supported earlier findings that suggested that arsenic is an essential element for the rat.

Interrelationship found between boron and cholecalciferol in chicks - Grand Forks, North Dakota. An interrelationship was found between boron and cholecalciferol in chicks. Boron markedly elevated the growth of cholecalciferol-deficient chicks, but not that of cholecalciferol-adequate chicks. Similarly, the activity of plasma alkaline phosphatase and the heart weight/body weight ratio were apparently unaffected by dietary boron in cholecalciferol-adequate chicks. However, the cholecalciferol-deficiency-induced elevation in the alkaline-phosphatase activity of plasma and the heart weight/body weight ratio was greater in boron deprived than in boron-supplemented chicks. Also, rachitic long bones were found in 17 of 21 boron-deprived chicks and in 9 of 22 boron-supplemented chicks fed the cholecalciferol-deficient diet. These findings suggested that boron modulates the function of cholecalciferol or is necessary for the efficient metabolism of cholecalciferol.

Effects of dietary treatments on the absorption or bioavailability of nickel in humans demonstrated - Grand Forks, North Dakota. The bioavailability of nickel for humans was evaluated by giving an oral dose of nickel and then determining the change in nickel concentration in the plasma. After the standard dose of nickel (5 mg) in water, nickel concentrations in plasma rose above the baseline fasting level. No significant change from the fasting levels resulted when nickel was added to either a typical Guatemalan meal or an American breakfast. Whole cow's milk, coffee, tea, orange juice, ascorbic acid, and NaFeEDTA, but not Coca Cola or phytic acid, depressed the bioavailability of the standard dose of nickel administered orally. At 3 and 4 hours after nickel intake, disodium EDTA, even in the presence of the standard 5 mg dose of nickel, depressed nickel in plasma significantly below levels during fasting.

Concentrations of amino acid in rat brain were unaffected by zinc deficiency - Grand Forks, North Dakota. The effect of zinc deprivation for 9 days on concentrations of amino acid in the rat brain was examined. The zinc deficient rats and control group had some differences in concentrations of amino acid and some differences in amino acid ratios; however, the concentrations of amino acids in the brain of zinc-depleted rats indicated that food intake was not directly influenced by the amino acids.

Dietary zinc produced changes in brain catecholamines - Grand Forks, North Dakota. Dietary zinc affected brain-catecholamine metabolism in the rat. After 9-10 days of severe zinc depletion, weanling rats had significantly higher brain-norepinephrine concentrations than did either ad libitum or pair-fed, zinc-adequate controls. Dopamine concentrations in the brain were irregularly elevated by zinc deficiency. Serotonin and 5HTAA were not increased. Brain catecholamines did not correlate with food intake in the zinc-deficient rats or in the ad libitum or pair-fed, zinc-adequate controls. After similarly fed rats were nutritionally rehabilitated, their brain catecolamines returned to normal. When pregnant rats were fed a diet severely deficient in zinc during the latter third of their pregnancy, they produced offspring that, after 90 days of rehabilitation, had significantly higher concentrations of brain dopamine than did zinc-adequate control rats.

Brain catecholamines in rat dams and pups was not influenced by mild zinc depletion - Grand Forks, North Dakota. At parturition and at the end of lactation, rat dams with a mild zinc deficiency (10 ppm zinc in the diet) had lower plasma-zinc concentrations than did zinc-adequate controls. Unlike the results when zinc deficiency was severe, this level of zinc depletion did not appear to influence the concentration of brain catecholamines in newborn (1-day old), weanling (2- to 3-day old), and adult offspring (90-day old).

Weight gain in rats was dependent on zinc/protein concentration in the diet - Grand Forks, North Dakota. Nine different diets containing concentrations of 8%, 15%, and 20% sprayed, egg-white protein with 6, 12, and 18 ppm zinc were fed to weanling male Long Evans rats for 30 days. Over that period, the rats fed 15% or 20% protein and 12 or 18 ppm zinc gained weight at the same rate. Also, rats fed 15% or 20% protein and 6 ppm zinc gained weight at similar rates, but significantly more slowly than rats fed diets containing 12 or 18 ppm zinc. At the lowest level of protein (8%), the rats fed the diet containing 18 ppm zinc gained the most weight. At this same level of protein (8%), the rats fed the diet containing 12 ppm zinc gained significantly less weight than the rats fed the diet containing 6 ppm zinc.

Zinc deficiency retarded neuroanatomical development in rats - Grand Forks, North Dakota. Severe zinc deficiency from birth to 21 days severely retarded development of the cerebellum of rats. Granular cell numbers were decreased as were the number of parallel fibers that synapsed with Purkinjee-cell dendrites. Dendrite formation was retarded and deformed in Purkinjee, basket, and stellate cells. The abnormalities were not associated with obvious abnormalities in locomotion or coordination.

Zinc dipicolinate therapy alleviated acrodermatitis enteropathica in children - Grand Forks, North Dakota. Three children with acrodermatitis enteropathica were given daily oral supplements of zinc (Zn) dipicolinate. The dose required to alleviate symptoms was less when Zn was given complexed with picolinic acid than when given as the sulfate. In two children, the dose of Zn dipicolinate required was one-third (10-15 mg) that of the Zn sulfate (30-45 mg). The third child required 30 mg Zn per day as sulfate but only 15 mg Zn as dipicolinate. G. Evans, Wayne State University (Detroit).

Increased levels of picolinic acid found in plasma from children with acrodermatitis enteropathica (AEA) - Grand Forks, North Dakota. Picolinic acid concentration in three asymptomatic children with AEA and in 12 normal children was assayed by high-pressure liquid chromatography (HPLC). The concentration of picolinic acid in the patients was 44.8 ± 4.3 μmol, whereas that in the normal children was 12.4 ± 3.3 μmol. In addition, the concentration of kynurenine in the plasma of the patients was 20.0 ± 5.2, but no kynurenine was detected in the plasma of normal children. The results suggested that the malabsorption of zinc in children with AEA may result from a genetic defect in tryptophan metabolism that impairs use of endogenous picolinic acid. G. Evans, Wayne State University (Detroit).

Parathyroid hormone immunoassay developed to determine human calcium requirements and metabolism during lactation - Houston, Texas. The parathyroid-hormone immunoassay was developed by the investigators, and its characteristics and reliability were tested in a pilot study of dynamic changes in immuno-reactive parathyroid hormone (iPTH) before and after breast feeding. The study was conducted with 12 breast feeding women and five women from each of two control groups. The results indicate that lactating women frequently exhibit afternoon peaks in iPTH that do not correlate with the timing of suckling.

Guinea pigs were generally chemically mature at birth - Houston, Texas. Chemical maturation in growing guinea pigs was investigated. Total body water, fat, nitrogen, calcium, sodium, and potassium were analyzed chemically in guinea pigs that weighed from 82-877 g. Results indicated that the guinea pig was chemically mature at birth--total body water, nitrogen, calcium, and potassium, but not for sodium. This work provided important baseline information for continuing studies of adaptations of guinea pigs to progressive limitations in amount of milk consumed.

Use of whole-body neutron-activation analysis to determine body composition in guinea pigs found possible - Houston, Texas. In this investigation, body sodium, calcium, and chloride of guinea pigs that weighed from 227-600 g were measured by analysis of total body-neutron activation and then by chemical analysis. Results with the two methods as analyzed by use of the paired "t" test indicated no significant differences for the three elements. This work demonstrated that, in metabolic experiments, neutron activation enables the use of laboratory animals as their own controls. Body composition can be assessed precisely with less than half the number of animals required by designs in which paired animals were used.

Use of stereophotogrammetry found promising for noninvasive measurements of body composition - Houston, Texas. The body fat and protein of miniature pigs (as animal models) were estimated from body weight, body minerals, total body water (measured by deuterium oxide and desiccation), and body volume (measured by underwater weighing and stereophotogrammetry). The estimated values of body fat and body protein were compared to the values measured by chemical analysis. The results provided preliminary evidence that stereophotogrammetry may be applicable for measuring body composition with noninvasive techniques.

Control mechanisms for sodium in breast milk determined - Houston, Texas. The normal breast-fed infant apparently receives a decreasing daily amount of dietary sodium (Na). The mean 24-hour concentration of Na in breast milk at 3 to 18 weeks postpartum exhibited a downward longitudinal trend. No definite longitudinal trend in milk potassium (K) was seen. Milk Na was independent of both maternal diet and maternal aldosterone secretion. Milk Na, K, and cortisol exhibited a diurnal rhythm. A reciprocal relationship between milk Na and K was defined. The change in K was approximately two-thirds of that in Na. Four hours after milk cortisol increased, milk Na decreased. Dexamethasone administation to mothers for 2 days resulted in a 35%-55% decrease in milk Na, with a reciprocal increase in K. Thus, glucocorticoids have a role in the regulation of milk electrolytes. The regulation may result from modulation of prolactin receptors. These studies are improving the understanding of the control of Na in breast milk.

Electron probe microanalyzer was used to establish intracellular electrolyte distribution - Houston, Texas. An electron probe microanalyzer was used in a study of electrolyte changes with maturation of normal rat skeletal muscle. In the study, intracellular sodium and chloride decreased in the gastronemium of 4-day-old rats, and potassium increased. The values determined with the microanalyzer agreed qualitatively with those for whole-tissue potassium and sodium as measured with conventional techniques. However, quantities of electrolytes differed because electron probe permits accurate measurements in localized intracellular spaces.

echnological Objective 3: Determine the requirements for vitamin intake by humans, and identify the chemical forms of the nutrients in foods that would be most useful in meeting those requirements.

he purpose of this program is to (1) improve the basis of the RDA for vitamin E y establishing the role of other nutrients such as methionine and selenium in he metabolism and requirement of vitamin E; (2) provide data on the vitamin $_6$ requirement of females during pregnancy or when they are taking steroid ral contraceptives; and (3) document the bioavailability of folacin in various egetable and cereal foods for humans, including improved methodology for easuring availability of folacin in foods.

PS Contact: J. M. Iacono

esearch Location: Beltsville, MD
Houston, TX

amples of Recent Progress:

dequacy of selenium levels during stress demonstrated - Beltsville, Maryland. his study was conducted to determine the effects of pregnancy and lactation on elenium metabolism and requirements. Selenium levels in maternal plasma or east milk were not correlated with dietary selenium intakes, as estimated from -day pooled dietary composites, nor were the selenium levels in breast milk and asma correlated. The selenium intakes of most of these Maryland mothers and eir breast-fed infants fell within the safe and adequate range as set by the tional Research Council, for their age groups.

stic fibrosis and selenium were uncorrelated - Beltsville, Maryland. A study o determine the role of selenium in cystic fibrosis was conducted in llaboration with Ricardo Castillo of the Children's Hospital at Stanford, CA. o statistically significant differences were found between serum selenium vels in normal children and those with cystic fibrosis. The mean level of erum selenium in the children used as controls (n=10) was 0.134 µg/ml with a ange of 0.103-0.159 µg/ml, whereas the level in the children with cystic fibrosis (n=28) was 0.113 µg/ml with a range of 0.042-0.171 µg/ml. These results suggested that low serum selenium levels do not play a role in the relentlessly progressive course of cystic fibrosis. R. Castillo, Children's Hospital (Stanford, CA).

Effects of vitamin E and iron on the filterability of red blood cells determined - Beltsville, Maryland. This study was conducted to determine the mechanism by which vitamin E and iron deficiencies decrease the filterability of red blood cells. Previous work had indicated that the decreased filterability of red blood cells from rats deficient in vitamin E was accompanied by extensive cross-linking of membrane proteins. In current work, filterability-impaired red cells from iron-deficient rats exhibited no such cross-linking. These results provided additional evidence that the molecular mechanisms that underlie changes in filterability caused by two different nutritional deficiencies are quite different. The mechanism in vitamin E deficiency presumably is due to oxidative stress, but the mechanism in iron deficiency is still not clear.

Vitamin B_6 supplementation of lactating women does not meet RDA for their breast-fed infants - Beltsville, Maryland. This study was to determine the vitamin B_6 intake requirement and status of postpartum lactating and nonlactating women. A secondary aspect of this study was to determine how much of the mother's vitamin B_6 intake the infant was receiving. The findings indicate that mothers with a total vitamin B_6 intake of 2-3 times the RDA for women will supply to their breast-fed infants less than 50% of the RDA for infants.

Technological Objective 4: Determine the requirements for protein and amino acid intake by humans, and identify the chemical forms of the nutrients in foods that would be most useful in meeting these requirements.

The purpose of this program is to (1) develop an improved method for assessing the biological value of proteins and of amino acids such as methionine and tryptophan in processed and cooked foods, (2) develop a new technique for measuring the protein-nutrition status of humans to better identify those whose dietary protein or amino-acid intake should be altered, and (3) develop a firm base for expanding the protein RDA to take into account a possible upper limit of protein intake for optimum health.

ARS Contact: J. M. Iacono

Research Locations:

Beltsville, Maryland
Boston, Massachusetts
Houston, Texas

Examples of Recent Progress:

Effect of dietary protein and phosphorus on bones and bone metabolism in rats determined - Beltsville, Maryland. The objective of this collaborative research was to determine the influence of dietary protein and phosphorus on calcium metabolism in rats. The results suggested that the feeding of a low level of calcium to rats induced secondary hyperparathyroidism that maintained blood calcium levels but resulted in hyperphosphaturia. J. Anderson, University of North Carolina (Chapel Hill).

Amino-acid absorption affected zinc absorption - Beltsville, Maryland. This collaborative research was initiated to assess the influence of high levels of dietary protein on mineral absorption. An *in situ* jejunal-perfusion system was established to study zinc absorption in adult rats. When the perfusate contained physiological saline and ^{65}Zn (15.6μM) ZnCl), 21% of the radioactivity was absorbed from the perfusate during the 30-minute perfusion experiments; addition of a complete amino-acid mixture to the perfusate increased the absorption to 35%. In addition, the radioactivity that accumulated in the perfused jejunal segment increased from 3,155 dpm/g, when saline and ^{65}Zn were perfused, to 9378 dpm/g when a complete amino acid mixture was added to the perfusate. W. Chan, Medical College of Virginia (Richmond).

Leucine metabolism during the postabsorptive state in the elderly investigated - Boston, Massachusetts. Twenty-five volunteers were studied at the Clinical Research Center of the Massachusetts Institute of Technology. They consisted of 4 elderly women (70-86 years old), 6 elderly men (70-79 years old), 5 young women (20-25 years old) and 10 young men (19-31 years old). All subjects were within 20% of Ideal Body Weight, based on the Metropolitan Life Insurance Tables. They were in good general health, as determined from a medical history, physical examination, and routine biochemical screening of plasma.

When computed per unit of body weight, values for leucine flux and incorporation into protein were significantly lower in elderly women than in young women, whereas leucine oxidation did not differ between the two age groups. No differences were found between young and elderly men for any of those parameters.

Because of the anticipated differences in body composition between the two age groups the dynamic components of leucine metabolism were also compared in relation to estimates of lean body mass and muscle protein content. The results revealed a tendency toward a decrease in both body composition compartments with advancing age, and the reduction of muscle mass was greater in the elderly men than in young men.

When computed per unit of LBM and per unit of muscle-protein mass, values for leucine flux, leucine incorporation into protein, and leucine oxidation, were slightly lower in elderly women than in young women, but the difference in values between the age groups was not significant. In elderly men, leucine flux and its components (leucine incorporation into protein and leucine oxidation) tended to be higher when expressed per unit of LBM or per unit of muscle protein mass than when expressed per unit of body weight, but did not differ significantly from those of young men.

Leucine metabolism was affected by intravenous glucose administration - Boston, Massachusetts. As part of a series of experiments concerned with dynamic aspects of whole-body N and amino-acid metabolism, investigators studied the responses of whole-body leucine dynamics, in postabsorptive young adult and elderly subjects, to intravenous administration of various doses of glucose and the influence of a simultaneous infusion of glucose and insulin.

The findings revealed that the whole body leucine flux is reduced when a glucose infusion, approximately twice the basal glucose production rate and resulting in a significant increase in plasma-glucose concentration, is administered to young adults and elderly subjects after they have fasted overnight. That reduction in flux reflected a reduction in whole-body protein breakdown because the only source of leucine entering the plasma compartment under those conditions would be via liberation of leucine from breakdown of organ and tissue protein.

Leucine dynamics in both young adult and elderly subjects appeared to respond similarly to a glucose infusion. However, these findings are based on a small number of elderly subjects and additional studies involving a greater number of individuals will be necessary before a firm conclusion can be drawn concerning the dynamics of leucin metabolism in response to administration of glucose in the two age groups.

Protein requirements for healthy elderly subjects were greater than current RDA - Boston, Massachusetts. A continuous, 30-day study of metabolic N balance was carried out in elderly men (75 ± 4 years) and elderly women (78 ± 9 years) to evaluate the current U.S. dietary protein allowance for older men and women. The N-balance data indicated that 0.8 g egg protein kg^{-1} day^{-1} is not sufficient to achieve N equilibrium in most subjects 70 years old or older and confirms the results and conclusions of a previous, short-term study of N balance (Uauy *et. al.*, Am. J. Clin. Nutr. 31:779-785, 1978). Hence, when energy intake approximates requirement, the current RDA is not adequate for most male and female subjects 70 years old or older.

nabolic steroids moderated the catabolic effects of carticosterone on muscle rotein metabolism in experimental models - Boston Massachusetts. The skeletal usculature contributes to the adaptations of body protein and energy etabolism, and muscle mass decreases markedly during the adult years. Thus, esearchers have continued to explore the effects--on muscle-protein reakdown--of changes in diet and hormonal status in rats as a basis for nderstanding the quantitative influence of nutritional and endocrine factors in e maintenance of skeletal muscle mass. Studies have concentrated on the nterrelationships between glucocorticoids and estrogenic and androgenic eriods with reference to muscle-protein breakdown, as determined from changes urinary N^{τ}-methylhistidine excretion. Although not completely analyzed, eliminary results indicate that anabolic steriods moderated the catabolic fects of corticosterone on muscle protein degradation.

ll-free system developed for studying abundance of messenger RNA's for ecific proteins - Boston, Massachusetts. The researchers devised a method for e one-step purification of ferritin from other proteins synthesized in an *in tro*, wheat-germ synthesizing system programmed with rat liver mRNA. The ptide products released from the polysomes were chromatographed on an ntiferritin sepharose 4B affinity column. The ferritin so isolated was judged re by SDS polyacrylamide slab gel electrophoresis. The recovery of the rified protein from the antibody column ranged from 83%-88%. Antibody finity columns can be arranged sequentially to allow the isolation of numerous roteins from one protein-synthesis reaction mixture. This method of isolation accordingly applicable to any protein for which antibody is available.

on administration increased ferritin, the iron-storage protein - Boston, assachusetts. Researchers have continued to use the response of the liver erritin to iron supply as a model for adaptive response. Ferritin accumulates apidly after a dose of iron is given to the rat. Liver ferritin consists of a rotein shell with two kinds of subunits, heavy (H) and light (L). In the bsence of iron stimulation, the liver makes ferritin shells of varying subunit composition, the average having a ratio of about 10H:14L subunits. In that population, shells with a large proportion of L subunits stored iron preferentially. After iron administration, iron storage in the L subunits increased, and the L-subunit synthesis was preferentially stimulated. That stimulation increased the number of L-rich shells for the incoming iron. Finally, storage of iron in shells rich in L was favored because those shells were less susceptible to intracellular proteolysis and survived longer than did H-rich shells. Enhanced iron storage apparently depends on the extra messenger RNA that is available for the L-subunits after iron administration.

Dietary zinc interfered with the storage of iron - Boston, Massachusetts. Earlier investigators observed that addition of large amounts of zinc to the diet of rats can retard growth, their hemoglobin levels and reduce storage of iron as liver ferritin. In the present studies, addition of 0.75% zinc to a synthetic diet confirmed the reduced storage of ferritin iron in the livers and spleens of growing rats but did not affect growth rate or hemoglobin level. However, the adverse effects of zinc excess on growth and hemoglobin level was reproduced by replacing the Rogers-Harper salt mixture used in the present studies with the Wesson salt mixture used in the earlier studies. Rats fed excess zinc along with the Wesson salt mixture grew less well, had anemia and also had low levels of copper in their livers. The addition of zinc to the low-copper Wesson salt mixture probably reduced copper absorption sufficiently that liver copper was depleted to a level at which mobilization of liver-iron stores by a copper-dependent mechanism became impaired, and iron stores were not available for red-cell and tissue-enzyme production. The mechanism by which iron stores are depleted by addition of zinc to the better balanced Rogers-Harper salt mixture remains unexplained. It was not due to interference by zinc with iron absorption from diet nor with cellular uptake of iron from circulating transferrin, and the capacity of tissues to store iron as ferritin was not impaired.

The nutrient content of milk from mothers who delivered term and preterm infants did not differ - Houston, Texas. The concentrations of protein nitrogen (PN), nonprotein nitrogen (NPN), energy (Cal), fat, sodium (Na), calcium (Ca), phosphorus (P), magnesium (Mg), and zinc (Zn) were determined in human milk from mothers who gave birth to infants classified as preterm appropriate-for-gestational age (PAGA, n=5); preterm small-for-gestational age (PSGA, n=4); term AGA (TAGA, n=5); and term SGA (TSGA, n=6). Samples were collected under controlled conditions at 2-week intervals for 12 weeks postpartum. PN concentrations did not differ significantly except between PSGA and TSGA. No other nutrient concentrations differed among the four groups. Concentrations of PN, NPN, Na, P, and Zn decreased over time. The concentration of Mg increased slightly. The content of F, Cal, and Ca did not change. These data indicated that the concentrations of some potentially limiting nutrients did not differ in milk from mothers who delivered term and preterm infants.

Nutrient and immunologic compositions of milk from lactating mothers changed during infant weaning - Houston, Texas. The mothers studied were healthy, and their infants had been fed breast milk exclusively for approximately 6 months. All subjects reduced milk production by approximately one-third each month over a 3-month period concomitant with the introduction of other foods. Samples collected under controlled conditions were obtained before weaning was initiated, and at 2-week intervals for 12 weeks. Significant changes were observed for N, Zn, Fe, Na total IgA, SIgA, and lysozyme. Ca and NPN concentrations did not change. Fat concentrations at 10 weeks were significantly higher than those at baseline. Those changes in nutrient concentrations illustrated the dynamic characteristics of human-milk composition and provided baseline information for planning the introduction of weaning foods into the diet as a child's intake of human milk is decreased. They were also consistent with increases in the concentrations of total protein observed during weaning in earlier studies. The concentration of lactoferrin tended to rise in some subjects but remained stable in others. These data provide baseline for assessing specific responses of immunologic components and their functional significance during weaning and are also useful for human-milk banking.

Technological Objective 5: Determine the requirements for carbohydrate and energy intake by humans, and identify the chemical forms of the nutrients in foods that would be most useful in meeting those requirements.

he purpose of this program is to (1) establish useful biochemical parameters or identifying the carbohydrate-sensitive individuals who may metabolize simple nd complex carbohydrates differently and may require some control over the ietary carbohydrate, (2) collect data that would indicate the level of those arameters at which to determine the state of life when diet modification, with espect to modification of kinds and levels of dietary carbohydrate would irectly benefit lipogenesis and indirectly benefit health; (3) develop a cientific base on the lipogenic and diabetogenic effects of starch. sucrose, ructose, and glucose in the diet; (4) provide needed data on the digestion and bsorption of various dietary carbohydrates, including the metabolic response to ertain fiber components.

PS Contact: J. M. Iacono

esearch Locations:

Beltsville Maryland
Houston, Texas

xamples of Recent Progress:

arameters and mechanisms of carbohydrate sensitivity established - Beltsville, aryland. Rats were starved for 2 days and then fed diets containing 45% carbohydrate as either sucrose or invert sugar. Levels of portal blood glucose, ructose, and total carbohydrate were determined at 0, 30, 60 and 120 minutes fter feeding. Rats fed the sucrose diet had significantly higher portal blood glucose and total carbohydrate levels at 60 and 120 minutes than did those fed the invert sugar diet. The portal-blood fructose levels of rats fed the sucrose and of those fed the invert sugar diets did not differ.

Effect of oral administration of monosaccharides and disaccharides on systemic blood-glucose and insulin levels of unadapted rats demonstrated--Beltsville, Maryland. After a 14-16 hour fast, rats were given, by mouth, solutions containing 250 mg/100 g body weight of monosaccharides (glucose or invert sugar) or disaccharides (maltose or sucrose). They voluntarily lapped up the solution as it was dropped on their tongues with a syringe. Blood samples for the determination of serum insulin and glucose were taken at 45 and 75 minutes after administration of the carbohydrate loads. At those times, serum insulin and glucose levels were higher in rats fed sugars containing only glucose (glucose, maltose) than in those fed sugars containing glucose and fructose (invert sugar sucrose). At 75 minutes, the feeding of disaccharides resulted in higher levels of serum insulin and glucose than did the feeding of monosaccharide equivalents. The results of this study suggested that increased levels of serum glucose in unadapted rats after an oral load of disaccharides or of sugars containing only glucose may act synergistically with gastric inhibitory polypetide to induce increased release of insulin. Because preliminary results indicated that gastric inhibitory polypetide levels may be higher in rats fed disaccharides than in those fed the monosaccharide equivalents, and because sucrose has been previously reported to be a secretagogue for gastric inhibitory polypeptide, the disaccharide effect may be mediated via an effect on gastric inhibitory polypetide.

Dietary carbohydrates did not affect systolic blood pressure of normotensive and hypertensive rats were unaffected by dietary carbohydrates - Beltsville, Maryland. Systolic blood pressure, weight gain, and relative total fat-pad size were measured in young male normotensive and spontaneously hypertensive rats fed 54% carbohydrate diets of 15 weeks. Blood pressure was higher (P 0.05) in hypertensive than in normotensive rats at 4, 9, or 14 weeks. Diets containing simple sugars (glucose, invert sugar, or sucrose) resulted in higher (P 0.05) blood pressure than did the starch diet. Within genotype, blood pressure was not different (P 0.05) among rats fed the three sugars. Blood pressure was not affected by body weight or relative total fat-pad size.

Effect of dietary fiber on lipid metabolism and on the rate of glucose absorption demonstrated - Beltsville, Maryland. New evidence was obtained in rats, that the inhibitory effect of pectin on cholesterol absorption was due, at least partially, to the increase caused by pectin, in excretion of cholesterol esters in feces. When cholesterol-4-^{14}C was administered in the diet, the increase in the cholesterol esters in feces of pectin-fed rats appeared to be exogenous. The profile of fatty acid esters in fecal cholesterol esters of pectin and cellulose diet groups differed. That difference might have been due to the source of cholesterol esters; exogenous or endogenous.

Lipid metabolism was affected by interaction of dietary fiber and lecithin on lipid metabolism - Beltsville, Maryland. Six groups of rats were fed diets that contained combinations of cellulose, soy lecithin, pectin and sapcnin. All diets contained 1% cholesterol. Lecithin was fed at the expense of corn oil in the diet. Both pectin and saponin lowered the levels of total lipid, cholesterol, and triglyceride in the liver, but pectin was more effective than was saponin. When soy lecithin was present with pectin, its effectiveness in lowering lipids was markedly greater. Serum high-density lipoprotein was significantly increased when soy lecithin was added to pectin or saponin diets.

Gastrointestinal roles in mediating nutritional responses to fiber, starches, and monosaccharides, and disaccharides demonstrated - Beltsville, Maryland. The elevation of total liver lipids and hepatic activities of certain lipogenic enzymes when starved rats are fed a high-carbohydrate diet for 2 days is reduced when certain edible gums are included in the diet. In general, the rise in total liver lipid and in hepatic glucose-6-phosphate dehydrogenase and malic enzyme activity was similar in animals that received either cellulose or one of the nonviscous gums and was significantly reduced by the feeding of any viscous gum. The modifyng effect of edible gums on the hepatic responses to starvation-refeeding apparently is closely related to the viscous properties of the gum.

Xanthum gum is a widely used, highly viscous, and poorly metabolized edible gum. The feeding of xanthan in place of cellulose slowed gastric emptying of ingested diet during the first 6 hours of refeeding. By then serum gastric inhibitory polypetide (GIP) had risen above fasting levels to a smaller degree than in control rats, and serum glucose and insulin followed a similar trend. The effect of the gum on serum GIP soon disappeared, but the effect of the gum on gastric emptying fell below levels that are detectable with present methods. Xanthan gum reduced the rise in hepatic glucose-6-phosphate dehydrogenase and in malic enzyme activities markedly after 24 hours of refeeding and moderately after 48 hours, but that effect later fell below the level of statistical significance. With prolonged refeeding, xanthan gum clearly reduced food intake slightly and, after 5 or 8 days of refeeding, nonfasting levels of serum glucose and insulin in gum-fed rats were below control levels.

Weight control program for obese children established - Beltsville, Maryland. Nine obese boys, ages 91/2 to 12 years, followed moderately restricted diets and light exercise routines for 31 weeks. Foods were selected from the family's basic diet. A decreased intake of 600 kcal per day (reduced from 2000 to 1400 kcal) was sufficient to stop weight gain and normalize key metabolic indices for prediction of atherosclerosis, hypertension, and diabetes. Throughout the 31-week treatment period, serum lipid responses included significantly lower (P0.05) total cholesterol, low-density lipoprotein cholesterol, and triglycerides. High-density lipoprotein cholesterol was constant throughout the period. Responses in carbohydrate metabolism included significantly lower ($P<0.05$) fasting levels of insulin, glucose, insulin glucose ratios, and glycosylated hemoglobins. Serum glucagon levels remained constant. In response to a glucose load, insulin and glucose decreased significantly by week 31 of treatment. Insulin and glucose levels were positively correlated with total caloric consumption ($P<0.05$) as was insulin with sucrose consumption (P0.05).
E. Kahle, Marshall University (West Virginia).

Face mask for neonates that permits collection of exhaled air developed - Houston, Texas. A face mask was designed for neonates that permits collection of exhaled air in 700-mL plastic bags. The mask consists of a Plexiglas$^{(R)}$ disk, fitted with two low-impedance, one-way valves, that is inserted into the cushion of an Airshield Ambu 01 neonatal resuscitation mask. The dead volume of the mask is less than 15 mL, this small dead volume permits the collection of breath samples containing at least 2% CO_2. The level of CO_2 in the collected breath samples is sufficient for gas isotope ratio mass spectrometric analysis of the ^{13}C enrichment of exhaled CO^2. Moreover, though the mask is particularly suited for ^{13}C breath test studies in neonates, it also may be used to collect samples for hydrogen production from unabsorbed carbohydrates in the colon. Hydrogen production is a sensitive indicator of carbohydrate malabsorption.

National Research Program 20920

FOOD CONSUMPTION AND USE

Technological Objective 1: Provide accurate, up-to-date, and comprehensive information, in a readily usable form, on food consumption and dietary levels.

The purpose of this program is to (1) establish and have available improved methodology--including more efficient techniques for gathering data on household food consumption and on the food intake of individuals--for integrating studies of nutritional status of individuals with studies of food consumption and for developing improved or simplified instruments for measuring changes in diet quality and for assessing improvements in nutrition; (2) compute annually the nutritive value of the U.S. per capita food consumption, using disappearance data developed by the Economic Research Service, and periodically summarize and analyze trends; (3) collect data on food consumption, dietary levels, and home-management practices of special population groups such as the poor; and data from limited-term surveys as needed to test the effectiveness of specific food programs of the Department; (4) develop plans for collecting and processing data for a survey of nationwide food consumption and for a survey of diets of individuals to improve accuracy and facilitate release of survey results; and (5) improve statistical procedures for data reduction to meet the need for overall measures of food and nutrient patterns to expedite analyses of trends and variations in diets and of the factors related to them.

NPS Contact: J. M. Iacono

Research Location:

Hyattsville, Maryland

Examples of Recent Progress:

Level of nutrients in national food supply estimated - Hyattsville, Maryland. Estimated and appraised the nutritive content of the U.S. per capita food supply each year, from 1909-1981, and analyzed trends in nutrient levels and food sources. Estimates were based on two sets of USDA information: (1) data on the annual consumption of 300-400 foods, as estimated by the Economic and Statistics Service, and their energy content; (2) data on the 24 nutrients and dietary substances in those foods, as provided by the Nutrient Data Research Group of the Consumer Nutrition Center.

Report on food consumption by individuals and household units prepared - Hyattsville, Maryland. Advance reports on household food consumption in the United States during spring 1977 were completed. Reports on household food consumption in Alaska, Hawaii, Puerto Rico, and low-income households (Low Income I-1977-78 and Low Income II-1979-80) were published or were in the review process by the end of FY 1981.

Volume 1 of a series of statistical handbooks on household food consumption in the 48 contiguous States for spring 1977 was submitted for publication in July 1981. The handbook provides information on the percentages of households that use the major foods and food groups, the average quantities of these foods consumed, and their money value, by household income level. Volumes 2-5, providing comparable information by region (Northeastern, North Central, Southern, and Western) are targeted for delivery to the editors by late 1981.

Preliminary reports were published on dietary intakes of individuals in Alaska and Hawaii. Comparable reports for individuals in Puerto Rico and for low-income individuals (Low Income I) were submitted for publication during the summer of 1981 and work was started on reports covering the supplementary surveys for Low Income II and the Elderly.

A report on amounts of foods used per day and per eating occasion was submitted for publication in July 1981. This bulletin of so-called portion sizes will provide updated information on quantities of foods consumed and percentages of persons using those foods for 16 sex-age groups as well as the total 16 groups.

Technological Objective 2: Provide consultative assistance on food and nutrition problems, and provide sound guidance materials on nutrition for consumers and for nutrition educators, program leaders, and food program managers to (1) identify techniques that will assist people in selecting nutritionally adequate diets within different budget limitations, (2) identify means for modifying undesirable food habits, and (3) encourage nutritionally desirable food choices.

The purpose of this program is to (1) develop food plans that will meet specific program needs, including plans for noncontiguous States and Territories and for use in the Food Stamp Program and in programs for feeding the elderly, (2) revise present food plans as needed, to meet nutritional needs at different spending levels, (3) develop and analyze alternatives to the Type A school lunch pattern, and other patterns for child nutrition programs, (4) provide guidance material for consumers and others to increase effectiveness in such areas as nutritional labeling, food-stamp allotments, and various community food-service programs, and (5) develop new, innovative techniques to help scientists interpret nutrition-research findings for target groups of consumers, along with publications to help consumers understand those findings.

NPS Contact: J. M. Iacono

Research Location:

Hyattsville, Maryland

Examples of Recent Progress:

NFCS data used for dietary guidance materials development and for expert assistance within and outside USDA - Hyattsville, Maryland. Data from the Nationwide Food Consumption Survey, Family Economic Research Group, were analyzed to determine absorbable iron in the diets of children. The nutrient contribution made to American households by enriched and fortified foods was tabulated and categorized by household income money value of the foods, and quality of diet. From the data on vegetarian eating patterns, foods consumed were identified and their nutrient content evaluated. These data were used to conduct a series of special analyses of food and nutrient intakes of children and the elderly. They will be further used to develop dietary guidance materials and to provide expert assistance within and outside USDA.

New dietary guidance materials developed to meet current needs and to assist in revising current publications as required - Hyattsville, Maryland. Developed diets for men and women to meet the 1980 RDA and levels of fat, cholesterol, and sugar specified in the Dietary Goal (1977) and to meet those standards relaxed by 15%. Results were presented at the annual meeting of the American Dietetic Association and later published in the Association's journal (May 1981). Menus published in "Ideas for Better Eating" were evaluated for cost level, based on price data from the Nationwide Food and Consumption survey. Defined dietary standards to be used in revising the USDA family food plans.

Technological Objective 3: Identify and develop suitable and safe procedures, for the management and preparation of food for home and institutional consumers, that will provide for the best retention of both nutritional and eating qualities and help prevent food-borne illness.

The purpose of this program is to (1) revise and update approximately half of the USDA recommendations and publications on consumer use of food commodities, (2) develop at least five new publications on food uses and procedures for population groups having special dietary problems, and (3) keep the USDA Food and Nutrition Service current on food-use information and recipes for their feeding programs.

NPS Contact: J. M. Iacono

Research Location:

Hyattsville Maryland

Examples of Recent Progress:

Revision of family food plans at different costs issued - Hyattsville, Maryland. Provided estimated costs for the family food plans monthly, including those for moderate- and liberal-cost plans. Developed a new thrifty food plan (TFP), in consultation with Food and Nutrition Service and others, based on data from the 1977-78 NFCS and on nutritional goals that were based on the 1980 RDA. Revised procedure for updating the cost estimates for the food plans, based on NFCS data and Bureau of Labor Statitics indices of food prices.

PUBLICATIONS

Hyattsville, Maryland

Consumer Nutrition Center. 1981. Nutrient levels in food used by households in the United States, spring 1977. Nationwide Food Consumption Survey 1977-78. U.S. Dept. Agr. Prelim. Rpt. No. 3. 16 pp.

Consumer Nutrition Center. 1981. Food consumption and dietary levels of households in Hawaii, winter 1978. Nationwide Food Consumption Survey 1977-78. U.S. Dept. Agr. Prelim. Rpt. No. 4. 29 pp.

Consumer Nutrition Center. 1981. Food and nutrient intakes of individuals in 1 day in Hawaii, winter 1978. Nationwide Food Consumption Survey 1977-78. U.S. Dept. Agr. Prelim. Rpt. No. 5. 66 pp.

Consumer Nutrition Center. 1981. Food and nutrient intake of individuals in 1 day in Alaska, winter 1978. Nationwide Food Consumption Survey 1977-78. U.S. Dept. Agr. Prelim. Rpt. No. 6. 61 pp.

Consumer Nutrition Center. 1981. Food consumption and dietary levels of households in Alaska, winter 1978. Nationwide Food Consumption Survey 1977-78. U.S. Dept. Agr. Prelim. Rpt. No. 7. 25 pp.

Consumer Nutrition Center. 1981. Food consumption and dietary levels of low-income households, November 1977-March 1978. U.S. Dept. Agr. Prelim. Rpt. No. 8. 33 pp.

Consumer Nutrition Center. 1981. Food consumption and dietary levels of households in Puerto Rico, summer-fall 1977. Nationwide Food Consumption Survey, 1977-78. U.S. Dept. Agr. Prelim. Rpt. No. 9.

Consumer Nutrition Center. 1981. Food consumption and dietary levels of low-income households, November 1979-March 1980. Nationwide Food Consumption Survey. U.S. Dept. Agr. Prelim. Rpt. No. 10.

Consumer Nutrition Center. 1981. Food consumption of households in the United States, spring 1977. U.S. Dept. Agr. Rpt. No. 11.

Cost of food at home. Family Economics Review, USDA-SEA-AR (winter 1981, spring 1981, 1 p. each); (summer 1981, 5 pp).

Guenther, P. M. and C. A. Chandler. 1981. Nutrients in food at home and away. Family Economics Review, USDA-SEA-AR. pp. 4-9.

Guenther, P. M. and C. A. Chandler. 1981. Nutrients in foods at home and away. 1981 Agricultural Outlook Conference, Washington, DC. 9 pp.

Hatfield, K. M. 1981. Changing home food production and preservation patterns. National Food Review, ESS. pp. 22-25.

Marston, R. M. and S. O. Welsh. 1981. Nutrient content of the national food supply. National Food Review, NFR-13, ESS, USDA. pp. 19-22.

Pao, E. M. and S. J. Mickle. 1981. Nutrients from meals and snacks consumed by individuals. 1981 Agricultural Outlook Conference, Washington, DC. 15 pp.

Pao, E. M. 1981. Changes in American food consumption and their nutritional significance. Food Technology 35:43-53.

Pao, E. M. and S. J. Mickle. 1981. Nutrients from meals and snacks consumed by individuals. Family Economics Review, USDA-SEA-AR. pp. 9-15.

Peterkin, B. B., P. C. Patterson, A. J. Blum, and R. L. Kerr. 1981. Changes in dietary patterns: One approach to meeting standards. J. Amer. Dietet. Assoc. 78(5):453-459.

Rizek, R. L., B. P. Perloff, and L. P. Posati. 1981. USDA's nutrient data bank. Food Technol. in Australia 33(3):112-114.

U.S. Senate. Food stamp and commodity distribution amendments of 1981. (Testimony on thrifty food plan by R. L. Rizek.) Report of Committee on Agriculture, Nutrition, and Forestry. Report No. 97-128, 97th Congress, 1st session. pp. 203-213.

Windham, C. T., B. W. Wyse, R. L. Hurst, and R. G. Hansen. 1981. Consistency of nutrient consumption patterns in the United States. Am. J. Dietet. Assoc. 78:587-595.

Woteki, C. E. 1981. Low-cost nutritious diet plans—a commentary. J. Nutr. Ed. 13(2):66.

Beltsville, Maryland

Anderson, R. A. 1981. Nutritional role of chromium. In: The Science of the Total Environment 17:13-29. Elsevier Scientific Publishing Company, Amsterdam.

Anderson, R. A. and M. M. Polansky. 1981. Dietary chromium deficiency: Effect of sperm count and fertility in rats. Bio. Trace Element Res. 3:1-5.

Blakely, S. R., J. Hallfrisch, S. Reiser, and E. S. Prather. 1981. Long-term effects of moderate fructose feeding on glucose tolerance parameters in rats. J. Nutr. 111:307-314.

Bodwell, C. E. and N. L. Marable. 1981. Effectiveness of methods for evaluating the nutritional quality of soybean protein. JAOCS 58:475-482.

Caddell, J. L., N. R. Calhoun, M. P. Howard, K. Y. Patterson, and J. C. Smith, Jr. 1981. Parenteral magnesium load testing with ^{28}Mg in weanling and young adult rats. J. Nutr. 111:103-138.

Dohm, G. L. and G. R. Beecher. 1981. The ovariectomized female rats as a model animal for the study of adaptation to endurance training. Lab. Anim. Sci. 31:146-148.

Dohm, G. L., G. R. Beecher, R. Q. Warren, and R. T. Williams. 1981. Influence of exercise on free amino acid concentrations in rat tissues. J. Appl. Physiol. 40:41-44.

Hallfrisch, J., L. Cohen, and S. Reiser. 1981. Effects of feeding rats sucrose in a high fat diet. J. Nutr. 111:531-536.

Howe, J. C. and G. R. Beecher. 1981. Effect of dietary protein and phosphorus levels on calcium and phosphorus metabolism of the young, fast growing rat. J. Nutr. 111:708-720.

Kelsay, J. L. 1981. Effect of diet fiber level on bowel function and trace mineral balances of human subjects. Cereal Chem. 58:2-5.

Kelsay, J. L., W. M. Clark, B. J. Herbst, and E. S. Prather. 1981. Nutrient utilization by human subjects consuming fruits and vegetables as sources of fiber. J. Agr. Food Chem. 29:461-465.

Lakshmanan, F. L., F. Lazicki, J. C. Howe, E. M. Schuster, and R. E. Barnes. 1981. Response of two strains of rats to a high-protein diet containing sucrose or cornstarch. Proc. Soc. Exp. Biol. Med. 167:224-232.

Leklem, J. E. and R. D. Reynolds. 1981. Recommendation for assessment of vitamin B_6 status. In: Methods in Vitamin B_6 Nutrition: Analysis and Status Assessment. Edited by J. E. Leklem and R. D. Reynolds. Plenum Press, NY. pp. 389-393.

Levander, D. A. and S. O. Welsh. 1981. Crosslinking of membrane proteins in red blood cells from vitamin E deficient, lead-poisoned rats. Life Sci. 28:147-154.

Metcoff, J., J. P. Costiloe, W. M. Crosby, L. Bentle, D. Seshachalam, H. H. Sandstead, C. E. Bodwell, F. Weaver, and P. E. McClain. 1981. Maternal nutrition and fetal outcome. Am. J. Clin. Nutr. 34:708-721.

Michaelis IV, O. E., R. E. Martin, L. Gardner, and K. C. Ellwood. 1981. Effect of dietary carbohydrate on systolic blood pressure of normotensive and hypertensive rats. Nutr. Rep. Int. 23:261-266.

Morris, E. R., R. Ellis, P. Steele, and P. Moser. 1981. Trace element nutriture response of adult men consuming dephytinized or non-dephytinized wheat bran in trace substances. In: Environmental Health-XIV. Edited by D. D. Hemphill. University of Missouri, Columbia, MO. pp. 103-109.

Polansky, M. 1981. Microbiological assay of vitamin B_6 in foods. In: Methods in Vitamin B_6 Nutrition: Analysis and Status Assessment. Edited by J. E. Leklem and R. D. Reynolds. Plenum Press, NY. pp. 21-44.

Reamer, D. C. and C. Veillon. 1981. Preparation of biological materials for determination of selenium by hydride generation - Atomic Absorption Spectrometry. Anal. Chem. 53:1192-1195.

Reamer, D. C., C. Veillon, and P. T. Tokousbalides. 1981. Radiotracer techniques for evaluation of selenium hydride generation systems. Anal. Chem. 53:245-248.

Reiser, S., M. C. Bickard, J. Hallfrisch, O. E. Michaelis IV, and E. S. Prather. 1981. Blood lipids and their distribution in lipoprotein in hyperinsulineic subjects fed three different levels of sucrose. J. Nutr. 111:1045-1057.

Reiser, S. and J. L. Kelsay. 1981. Metabolic effects of dietary sucrose and fiber on humans. In: Beltsville Symposia in Agricultural Research IV, Human Nutrition. Edited by G. R. Beecher. Allanheld, Osmun, and Company, Montclair, NJ.

Smith, J. C., Jr., R. A. Anderson, R. Ferretti, O. A. Levander, E. R. Morris, E. E. Roginski, C. Veillon, W. R. Wolf, J. B. Anderson, and W. Mertz. 1981. Evaluation of published data pertaining to mineral composition of human tissue. Fed. Proc. 40:2120-2125.

Stewart, K. K. and A. G. Rosenfeld. 1981. Automated titrations: the use of automated multiple flow injection analysis for the titration of discrete samples. J. Auto. Chem. 3(1):30-32.

Szepesi, B., M. Sears, and T. H. Liao. 1981. CNS depressant, food restriction and "weight rebound" in the rat. Nutr. Rep. Int. 23:763-770.

Vanderslice, J. T., C. E. Maire, and G. R. Beecher. 1981. B_6 vitamer analysis in human plasma by high performance liquid chromatography: A preliminary report. Am. J. Clin. Nutr. 34:947-950.

Vanderslice, J. T., C. E. Maire, and G. R. Beecher. 1981. Extraction and quantification of B_6 vitamers from meats, animal tissue, and human plasma: A preliminary study. Proceedings of a workshop. In: Methods in Vitamin B_6 Nutrition: Analysis and Status Assessment. Edited by J. E. Leklem and R. D. Reynolds. Plenum Press, NY. pp. 123-147.

Vanderslice, J. T., C. E. Maire, and J. E. Yakupkovic. 1981. Vitamin B_6 in ready-to-eat cereals: Analysis by high performance liquid chromatography. J. Food Sci. 46:943-946.

Vanderslice, J., K. Stewart, G. Rosenfeld, and D. Higgs. 1981. Laminar dispersion in flow injection analysis. Talanta 28:11-18.

Veillon, C. and D. C. Reamer. 1981. Preparation of high-purity volatile acids and bases by isothermal distillation. Anal. Chem. 53:549-550.

Boston, Massachusetts

Crim, M. C. and H. N. Munro. 1981. Protein. *In:* Present Knowledge in Nutrition. The Nutrition Foundation, Inc., Washington, DC.

Gershoff, S. N. and R. B. McGandy. 1981. The effects of vitamin A deficient diets containing lactose in producing bladder calculi and tumors in rats. Am. J. Clin. Nutr. 34:483-489.

Munro, H. N. 1981. Nutrition and Aging. British Med. Bull. 37:83-88.

Munro, H. N. and V. R. Young. 1981. Use of N^T-methylhistidine excretion as an *in vivo* measure of myofibrillar protein breakdown. *In:* Nitrogen metabolism in Man. Edited by J. C. Waterlow and J. M. L. Stephen.

Young, V. R., M. Gersovitz, and H. N. Munro. 1981. Human aging: Protein and amino acid metabolism and implications for protein and amino acid requirements. *In:* Nutritional Approaches to Aging Research. Edited by G. B. Moment. CRS Press, FL.

Grand Forks, North Dakota

Evans, G. W. 1981. Picolinic acid in human milk. Pediatr. Res. 15:168.

Evans, G. W. 1981. The role of copper in metabolic disorders. *In:* Advances in Experimental Medicine and Biology, Volume 135. Edited by M. Phillips and A. Baetz. Plenum Press, NY. pp. 121-137.

Evans, G. W. and E. C. Johnson. 1981. Effect of iron, vitamin B_6 and picolinic acid on zinc absorption in the rat. J. Nutr. 111:68-75.

Klevay, L. M. 1981. Hair as a biopsy material. VI. Hair copper as an index of copper in heart and kidney of rats. Nutr. Rep. Int. 23:371-376.

Klevay, L. M. 1981. Reply to letter by Fischer and Collins. Am. J. Clin. Nutr. 34:597-598.

Klevay, L. M. and K. E. Viestenz. 1981. Abnormal electrocardiograms in rats deficient in copper. Am. J. Physiol. 240(9):H185-H189.

Klevay, L. M., D. Mendelshohn, J. J. Vanderwatt, L. M. Davidson, and D. Kritchevsky. 1981. Aortic sudanophilia and liver zinc to copper ratios in vervet monkeys fed different types of dietary fiber. South African Med. J. 59:605.

Metcoff, J., J. P. Costiloe, W. Crosby, L. Bentle, D. Seshachalam, H. Sandstead, C. E. Bodwell, F. Weaver, and P. E. McClain. 1981. Maternal nutrition and fetal outcome. Am. J. Clin. Nutr. 34:708-721.

Sandstead, H. H. 1981. Methods for determining nutrient requirements in pregnancy - I. Am. J. Clin. Nutr. 34:697-704.

Sandstead, H. H. 1981. Zinc, copper, and cholesterol. J. Am. Med. Assoc. 245:1528.

Solomons, N. W., C. H. L. Rieger, R. A. Jacob, R. Rothberg, and H. H. Sandstead. 1981. Zinc nutrition and taste acuity in patients with cystic fibrosis. Nutrition Res. 1:13-24.

Solomons, N. W., J. B. Wagonfeld, C. Rieger, R. A. Jacob, M. Bolt, J. V. Horst, R. Rothberg, and H. H. Sandstead. 1981. Some biochemical indices of nutrition in treated cystic fibrosis patients. Am. J. Clin. Nutr. 34:462-474.

Solomons, N. W. and R. A. Jacob. 1981. Studies on the bioavailability of zinc in humans: Effects of heme and non-heme iron on the absorption of zinc. Am. J. Clin. Nutr. 34:475-482.

Tucker, D. M., C. E. Stenslie, R. S. Roth, and S. L. Shearer. 1981. Right frontal lobe activation and right hemisphere performance. Arch. General Physchiatry 38:169-174.

Tucker, D. M. and H. H. Sandstead. 1981. Spectral electroencephalographic correlates of iron status: Tired blood revisited. Physiol. Behav. 26:439-449.

Wallwork, J. C., G. J. Fosmire, and H. H. Sandstead. 1981. Effect of zinc deficiency on appetite and plasma amino acid concentrations in the rat. Brit. J. Nutr. 45:127-136.

Houston, Texas

Anderson, D. C., M. L. Mace, R. R. Martin, C. W. Smith. 1981. Recurrent infection in glycogenosis type Ib: abnormal neutrophil mobility related to impaired redistribution of adhesion sites. J. Infect. Dis. 143:447-459.

Bell, R. L., B. Christensen, A. Holguin, and E. O. Smith. 1981. St. Louis encephalitis: A comparison of two epidemics in Harris County, Texas. Am. J. Public Health 71:168-170.

Ferry, G. D. and D. W. Bendig. 1981. Peroral small bowel biopsies in infants and children using a directable biopsy instrument. Digest. Dis. Sci. 26:142-145.

Ingram. F. D. and M. J. Ingram. 1981. Freeze-dried, plastic-embedded tissue preparation. A review. Scanning Electron Microsc. 4:147-160.

Klein, P. E., D. A. Schoeller, and E. R. Klein. 1981. Recent developments in biomedical applications of stable isotopes. In: Proceedings of the Clinical Research Center Symposium on HPLC, GC, and MC Applications in Clinical Research. Edited by A. M. Lawson. Academic Press, NY, London. pp. 119-134.

Lifschitz, C. and S. LaSala. 1981. Pancreatitis, cholecystitis, and choledocholithiasis in a girl with infectious mononucleosis. Clin. Pediatr. 20:131.

Mallette, L. E., L. Gomez, and R. G. Fisher. 1981. Parathyroid angiography: A review of current knowledge and guidelines for clinical application. Endocr. Rev. 2:124-135.

Metcoff, J., E. R. Klein, and B. L. Nichols. 1981. Nutrition of the child: Maternal nutritional status and fetal outcome. Am. J. Clin. Nutr. (Supp.) 34:653-817.

Nichols, B. L. 1981. Sodium intake of infants in the United States. In: Infant and Child Feeding. Edited by J. Bond. Academic Press, NY. pp. 317-322.

APPENDIX C

REPORT ON THE EVALUATION OF CLINICAL NUTRITION RESEARCH UNITS, FISCAL YEAR 1982

INTRODUCTION

Under the authority of the Public Health Service Act, Section 301 (amended), the National Institutes of Health (NIH) support Clinical Nutrition Research Units (CNRUs). These Units are designed to encourage a multidisciplinary approach to clinical nutrition, and to complement NIH-supported project grants and training awards and relevant activities funded from other sources. Currently there are seven CNRUs supported by the National Institutes of Arthritis, Diabetes, and Digestive and Kidney Diseases (NIADDK) and the National Cancer Institute (NCI).

Advances in nutritional sciences are derived from, and thus dependent on, many disciplines (such as biochemistry, molecular biology, genetics, and physiology) and medical specialties (such as internal medicine, obstetrics, pediatrics, and surgery). The dependence upon the close interaction among research, health services, and education is evident in each of the CNRUs in operation. Examples of major efforts of the Units include research in hospital malnutrition and its prevention; research in the role of nutrition in the etiology and prevention of cancer, diabetes, atherosclerosis, cystic fibrosis, and other diseases; clinical investigations in the nutrition requirements of infants and children for normal growth and development; and the development of high quality Nutritional Support Services.

In 1981, site visits were made to each of the four CNRUs funded in August or September, 1979; in 1982, similar visits were made to Units initiated in September, 1980. The purpose of these site visits, conducted collaboratively by representatives from NIADDK, NCI, and several non-NIH clinical nutrition scientists, was to evaluate the effectiveness of the CNRU mechanism at each site after 20 months of operation. In 1982, scientists from the Veterans Administration and the United States Department of Agriculture Nutrition Center were also invited to participate in the evaluation vists.

A continuing goal of NIH is to enhance coordination and cooperation among the CNRUs; to stimulate multidisciplinary nutrition research, nutrition education, and research training in nutrition; and to encourage the development of Nutritional Support Services in medical centers.

The Comptroller General's Final Report, Progress Made in Federal Human Nutrition Research Planning and Coordination; Some Improvements Needed,[1] recommended that the Secretary of Health and Human Services (HHS) instruct the Director of the National Institutes of

---

[1] U.S. Government Accounting Office. Progress Made in Federal Human Nutrition Research Planning and Coordination; Some Improvements Needed, Pubn. No. CED-82-56, May 21, 1982.

Health (NIH) to prepare a summary report on the activities of Clinical Nutrition Research Units (CNRUs). This publication has been prepared in response to that recommendation and provides background information about, and highlights of, the CNRU initiative in nutrition research, training in nutrition research, nutrition support services, and nutrition education. The report is intended to be useful and informative to Federal nutrition research administrators and other interested parties, including specific Congressional committees and the scientific community.

I. BACKGROUND AND OBJECTIVES OF THE CNRU PROGRAM

In January of 1979, The National Institutes of Health (NIH) issued a Request for Applications (RFA) for core grants as a means of encouraging a multidisciplinary approach to clinical nutrition research.[2,3] This solicitation was designed to complement the ongoing NIH-supported research grants and training awards and to promote good health by disseminating new nutrition research findings to physicians, other health professionals, and the public.

More specifically, the CNRU initiative is designed to provide a milieu for nutritional research, training, and education through coordinated effort, intellectual stimulation, and use of shared resources. The objectives of the program are to:

- Create or strengthen foci in biomedical research institutions for multidisciplinary research in clinical nutrition in

---

[2] Request for Applications: Core Grants for Clinical Nutrition Research Units (CNRUs), NIH Guide Supplement for Grants and Contracts, January 26, 1979.

[3] The initial recommendation of core center support for clinical nutrition research, arose from an ad hoc Nutrition Program Advisory Group to the National Institute of Arthritis, Metabolism, and Digestive Diseases (NIAMDD), now the National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases (NIADDK). The Institute issued a Request for Applications for CNRUs in November, 1978. When the NIH Nutrition Coordinating Committee (NCC) supported this approach in January, 1979, a superseding interinstitute grant was announced. Currently, both the NIADDK and the National Cancer Institute (NCI) fund CNRUs.

order to develop new knowledge about specific nutrients in health, human development, and the prevention and treatment of disease.

- Strengthen training environments in order to improve the education of medical students, house staff, practicing physicians, and paramedical personnel in clinical nutrition.
- Enhance patient care and promote good health by focusing attention on clinical nutrition and generating nutritional information for the public.

Currently, the NIH supports seven CNRUs; five centers are funded by the National Institute of Arthritis, Diabetes, and Digestive and Kidney Diseases (NIADDK) and two by the National Cancer Institute (NCI). In combination, the NIADDK and NCI have directed $9,302,831 to the Units since the start of the program[4]; another $2,729,374 is projected to be spent in FY 1983. Appendix A provides the complete funding history for all seven Clinical Nutrition Research Units.

---

[4] Sum of actual funding totals for FY 1979 through FY 1982.

Each CNRU consists of seven components:

- Research with human subjects and populations;
- Laboratory investigations;
- Research training;
- Shared facilities and research services;
- Educational programs for medical students, house staff, practicing physicians, and paramedical personnel;
- Nutritional support services; and
- Public information activities.

Although the NIH has traditionally sponsored some of the aforementioned activities through research or training awards, the CNRU grant program is unique in its emphasis on shared resources and services. This stipulation has proven especially valuable in promoting multidisciplinary interaction, which advances understanding of nutritional sciences. Just as persons involved in biochemistry, physiology, endocrinology, and other sciences must work closely together to achieve breakthroughs in fundamental knowledge in nutrition, those involved in the appropriate medical specialties and subspecialties (i.e. internal medicine, gastroenterology, obstetrics, pediatrics, and surgery) must cooperate to rapidly integrate research findings into clinical applications. CNRUs, therefore, are one creative means by which clinical nutrition research is being effectively advanced within the modern organizational structure of medical research and practice.

CNRU sharing of facilities, particularly core nutrition laboratories, has also helped increase the number of new multidisciplinary research projects in clinical nutrition and related areas. An average of 23 clinical nutrition research protocols (ranging from 7 to 40) are now active at each Unit. This focus on clinical nutrition research has positively influenced the training of medical students as well as the day-to-day practice of clinical medicine in each of the participating institutions.

A third benefit of the CNRU shared facilities approach has been its ability to attract additional support, both from Federal and non-Federal sources. This mechanism has helped reduce the likelihood of any Unit becoming dependent on a single source of funds for its continued operations. For example, all CNRUs have obtained outside funds for educational programs and Nutritional Support Services. While such activities are required of each Unit, they may not be supported from NIH-program funds.

In other areas, CNRUs provide temporary salary support for recently trained investigators or investigators new to nutrition research. This new investigator funding has proven highly effective in attracting young scientists to conduct clinical nutrition research, complementary to ongoing activities of the group. New investigators also have assumed major faculty commitments, facilitated interdisciplinary participation, and significantly lessened the Directors' burden of Unit administration.

Following 2 years of CNRU stipend, the investigators are supported by the participating institutions. This program feature is expected to yield a meaningful number of well-trained clinical nutrition research scientists in the near future.

The NCI and NIADDK regularly monitor and evaluate the progress of CNRUs in reaching their goals through review of Unit reports, annual meetings, and site visits. In 1981 and 1982, site visits were conducted at all seven Units by representatives from the sponsoring Institutes as well as non-NIH clinical nutritionists.[5] Future visits also are planned to reassess CNRU activities and accomplishments.

Reports of site visits as well as other CNRU activities to date have documented the significant accomplishments of the Units; highlights of these achievements are presented herein. As a result of the program, it appears that: nutrition is being effectively integrated as a component of a broad spectrum of research projects; nutrition courses are being integrated into the affiliated medical school curricula; residents from various disciplines are rotating through nutrition "services;" and nutrition education materials are being developed for professionals and the general public. In March, 1982, a Nutrition Advisory Group convened by NIADDK, cited the creation of CNRUs as a major contribution to the field. The House Appropriations Committee also has commended the initiative "to increase clinical nutrition research and training and to upgrade utilization of knowledge in clinical practice."[6] The Committee reportedly "will watch the development of nutrition research at NIH with considerable interest and expects to be informed from time to time of the progress being made."[7]

---

[5] Scientists from the Veterans Administration and United States Department of Agriculture Nutrition Center were invited to participate in site visits during 1982.

---

[6] U.S. Congress. House Committee on Appropriations. *Departments of Labor, Health and Human Services, and Education, and Related Agencies Appropriation Bill, 1981*. H. Report 1244, 96th Cong., 2d. sess., 1980. House Miscellaneous Reports on Public Bills, Ser. Vol. 13374, p. 30.

[7] Ibid., p. 30.

DESCRIPTION OF CNRUs FUNDED

Of the seven CNRUs supported by NIH, four were initiated in FY 1979 and three in FY 1980. They are:

Initiated in FY 1979

University of Alabama at Birmingham	Birmingham, AL
University of Chicago	Chicago, IL
University of Wisconsin	Madison, WI
Vanderbilt University School of Medicine	Nashville, TN

Initiated in FY 1980

Columbia University College of Physicians and Surgeons	New York, NY
Medical College of Georgia at Augusta	Augusta, GA
Memorial Sloan-Kettering Cancer Center/ New York Hospital-Cornell Medical Center/Rockefeller University	New York, NY

Units located at the University of Alabama in Birmingham and at Memorial Sloan-Kettering/Cornell/Rockefeller are funded by NCI, and the remainder by NIADDK.

These seven CNRU sites were selected after review by special study sections, convened by the Division of Research Grants. Evaluation was based on criteria which included: stated objectives of the proposed CNRUs; realized and potential impact of the Units on advances in clinical nutrition research; clinical nutrition research and training experience of the proposed Unit leaders; institutional commitments to research in nutritional sciences and to the proposed Units; anticipated CNRU budgets; opportunities for increased research activities across disciplinary or departmental lines; and other factors. A brief description of each of the CNRUs follows.

The CNRU at the University of Alabama in Birmingham (UAB) is directed by Charles Butterworth, M.D., Professor and Chairman of the Department of Nutrition Sciences. This Unit consists of: (1) a central coodinating administrative staff; (2) a clinical nutrition support service for inpatients and outpatients; (3) core research laboratories; and (4) diagnostic laboratories. Construction of a Nutrition Sciences Building, in which various activities of the CNRU will take place, is now near completion.

The overall goals of the CNRU at UAB are improved patient care and disease prevention, including improved nutrition education and information exchange. Numbered among its major activities are studies related to:

o Malnutrition of hospital patients and its prevention (including promotion of awareness of malnutrition, identification of high-risk patients, development of clinical and laboratory assessment techniques, development of therapy guidelines, and education of staff for quality nutritional care);

- Identification of the role of nutrient factors in the etiology and prevention of cancer;
- Feeding problems, including obesity, anorexia, bulimia, short bowel syndrome, and home parenteral nutrition;
- Multiphasic screening for vitamin status assessment;
- Folic acid biochemistry and metabolism.

There are 19 full-time faculty members in the Department of Nutrition Sciences (four M.D.s, one M.D.-Ph.D., one M.D.-Dr.P.H., seven Ph.D.s, five M.A.-R.D.s, one M.A.). In addition, a biostatistician, clinical psychologist, and pharmacist have joint appointments in Nutrition Sciences.

The CNRU at Memorial Sloan-Kettering Cancer Center (MSKCC), New York Hospital-Cornell Medical Center, and The Rockefeller University was funded in September, 1980. Dr. Richard I. Rivlin, the Unit director, serves as Chief of the Division of Nutrition at Memorial Sloan-Kettering and at New York Hospital-Cornell Medical Center; he also works with investigators at the Rockefeller University who share interests in nutrition.

In addition to an administrative core facility, this Unit consists of five core laboratories: biophysics, immunology, lipid metabolism, mass spectrometry, and trace metals. The major areas of research involvement include: lipids, metabolism and diabetes, and nutrition and its relationship to immunology, burns, pharmacology, and the brain.

Patient care and public/professional education are highly visible components of the MSKCC/Cornell/Rockefeller Unit. Noted as one of the pioneer programs in the country, the Nutritional Support Service recommends in- and outpatient total parenteral nutrition (TPN) and enteral nutrition.[8] The Nutrition Support Kitchen works in cooperation with the Service and evaluates intake and acceptability of formulas, prepares and distributes oral tube feedings, and trains outpatients in home TPN. The Nutrition Information Center functions as a central resource for gathering and disseminating information on clinical nutrition, nutrition research, and general nutrition principles to professionals in participating institutions and the general public.

---

[8] TPN provides all the nutritional needs of the patient intravenously by infusing a sterile solution through a central venous catheter inserted into the individual's superior vena cava. Patients receiving enteral nutrition support are fed formulas via nasogastric, nasojejunal, gastrostomy, jejunostomy, or esophagostomy tubes. In addition to tube feedings, therapy also may involve special oral preparations and/or supplemental formulas.

The University of Chicago CNRU, directed by Irwin H. Rosenberg, M.D., Professor of Medicine and Director of the Division of Gastroenterology and Nutrition, facilitates and encourages clinical investigation in nutritional aspects of human diseases. By extending the efforts of the University's Committee on Human Nutrition and Nutritional Biology, the CNRU fosters interdisciplinary efforts in clinical nutrition research, patient care, education, and research training.

Specifically, the CNRU is comprised of an administrative core that coordinates education and training and six core laboratories in lipid analysis, lipoproteins, vitamins, trace metals, stable isotopes, and radioimmunoassays. Research undertaken within these core laboratories deals with lipid metabolism and cardiovascular disease; metabolism of vitamins, minerals, and trace metals; stable isotopes/breath tests; and the interrelationships between nutrition and growth, digestive disorders, and diabetes. The core laboratories also provide assay support for clinical protocols conducted by the Nutritional Support Service.

To promote professional development, the CNRU holds research seminars and meetings of the Human Nutrition Journal Club on a monthly basis. At present, eight students are enrolled in the University of Chicago's master's program in clinical nutrition, and three in its new doctoral program.

The CNRU at the University of Wisconsin is actively engaged in research, education and training, and patient care in clinical nutrition under the direction of Alfred E. Harper, Ph.D., Professor and Chairman of the Department of Nutritional Sciences, and Earl Shrago, M.D., Professor of Medicine and Nutritional Sciences. Organization of this Unit is based on three activities: administrative, services and facilities, and investigators/users.

Research areas emphasized in the CNRU are carnitine nutriture, including its potential deficiency in disease states, and carnitine therapy; the effects of nutrients and foods on serum lipids, particularly total and high density lipoprotein (HDL) cholesterol; and the potential adverse effects of TPN leading to complications of fatty liver and metabolic bone disease. The Unit also affords care and pilot support for clinical nutrition research conducted by the Cancer Center and Specialized Center for Research in Metabolism and Nutrition of Infant Lung Disease.

At the University of Wisconsin, research projects continue to play an essential role in clinical nutrition training programs. In addition to postdoctoral fellows and graduate students with individual investigator awards, the University provides financial support for four M.D. fellowships in clinical nutrition. Future plans call for the initiation of predoctoral and postdoctoral training programs in oncology and nutrition.

The Vanderbilt University School of Medicine CNRU is headed by Harry L. Greene, M.D., Associate Professor of Pediatrics and Head, Division of Gastroenterology. Formation of this CNRU has enhanced nutrition research, a strong component of the University's investigative involvement for more than 50 years. The large contingent of nutritional scientists with expertise and interest in biochemistry and dietetics, and the recognition by the medical community of the need for clinical nutrition services, have contributed significantly to the establishment of: (1) cohesive core facilities for laboratory, clinical, computer, and administrative activities directed toward patient needs; and (2) a mechanism to foster clinical nutrition research.

Clinical nutrition research permeates all areas of clinical medicine at this University, with active projects in the Departments of Obstetrics and Gynecology, Surgery, Medicine, and Pediatrics at the Vanderbilt University (VU) and Veterans Administration (VA) Hospitals.

Formal and informal programs of nutrition education for nurses and medical students occur regularly. Both the VU and VA staffs receive a bimonthly newsletter that describes research advances and offers practical advice in nutritional support. Since members of the CNRU staff participate in TPN audits and new product evaluations, they are considered valuable resources for teaching and patient consultations.

The CNRU at The Medical College of Georgia, directed by Elaine Feldman, M.D., Chief, Section of Nutrition, Department of Medicine, and Director of the Georgia Institute of Human Nutrition (GIHN), serves as the research arm of the GIHN. The staff of this CNRU functions in clinical research, education and training, and service to gather information concerning the etiology and treatment of nutrition-related disorders affecting the population of Georgia.

Since its initiation in 1980, research efforts at this CNRU have focused on the prevention and treatment of: (1) dietary and genetic hyperlipidemias; (2) trace mineral deficiencies; and (3) obesity. A secondary research thrust has involved defining the impact of specific diseases and associated stress on patients' nutritional requirements for calories, protein, and trace minerals.

The CNRU's core laboratories provide analytical services for: lipids; lipoproteins and their apoproteins; total proteins, nitrogen, and amino acids; B vitamins (by enzyme dependent activity), vitamins A and E, selenium, and glutathione peroxidase; indirect calorimetry; and zinc and copper analyses.

The CNRU at Columbia University College of Physicians and Surgeons, directed by Myron Winick, M.D., Professor of Pediatrics and Director of the Institute of Human Nutrition, focuses on the pediatric patient. General areas of research, encouraged and supported by the CNRU, concern nutrition of low birth weight infants, metabolic effects of TPN, cholesterol turnover, and metabolic response to the stress of illness.

The clinical research activities of the Unit are channelled through three core components: the clinical core, laboratory core, and biomathematics core. The nucleus of the clinical core, which includes a team of physicians, nutritionists, nurses, and technicians, is the Nutritional Support Service at Babies Hospital (Presbyterian Hospital in New York City). Additional personnel are provided by CNRU funds, which insures that nutritional support is available for research as well as clinical needs. Activities involving neuropsychological follow-up and studies of energy expenditure are strictly oriented toward research.

The laboratory core includes an amino acid laboratory, a lipids laboratory, and a general biochemistry and nutrition laboratory. The assays performed in these laboratories are available to any investigator within the University, provided that the study in which they are participating meets the approval of the CNRU's advisory committees. Unlike the clinical core, this component is available for clinical nutrition research purposes only.

The biomathematics core includes a team of biostatisticians and computer programmers who assist with study design as well as data analyses. Computer facilities used by the team are shared with other major research groups.

The Institute of Nutrition's academic program includes both master's and doctoral degree programs. The institute also sponsors a required course for second-year medical students and a general lecture series. Public education activities include a yearly symposium, a monthly newsletter, and a public radio program.

III. RECENT ACTIVITIES AND ACCOMPLISHMENTS OF CNRUs

Through Clinical Nutrition Research Units (CNRUs), the NIH has made great strides toward realizing the objective of upgrading the role of clinical nutrition in the participating institutions. The program has helped to initiate and improve multidisciplinary research projects in clinical nutrition, recruit new investigators to the field, and strengthen training environments. Improvements have also been observed in the coordination and delivery of nutrition-related patient care as well as in communication to professionals and the public concerning advancements in nutrition research.

While the following CNRU activities and accomplishments are representative of those underway at all Units, these highlights have been selected to illustrate the overall nature of the program. A comprehensive listing of research projects and investigators is included in Appendix B.

A. Nutrition Research

Among the objectives of the CNRU program is the creation and/or strengthening of biomedical research to develop new knowledge concerning specific nutrients in health, human development, and the prevention and treatment of disease. CNRU support for new investigators, pilot studies, and core laboratories has stimulated multidisciplinary collaboration as well as contributed to the growth of a substantial research base. At present the participating institutions are examining the role of nutrition in cancer, cardiovascular disease, diabetes, renal disease, cystic fibrosis, seriously ill patients, growth in infants and children, and human metabolism.

Nutrition and Cancer. Investigations concerning the relationships between diet and cancer at the University of Alabama in Birmingham, are focusing on the role of folates in various tumor types. The first of these studies has determined that diets of patients with cervical dysplasia are often low in ascorbate and deficient in folate. Moreover, supplementation resulted in reversal of dysplasia. Previous studies have demonstrated that human breast cancer cells have significantly greater folate conjugase activity than normal adjacent breast tissue. Researchers therefore postulate that increased folate conjugase activity causes increased folate turnover, perhaps leading to localized folate depletion.

Several CNRUs are conducting studies on the derangements in animal and human metabolism that occur with cancer. Mechanisms responsible for weight loss, anorexia, and cachexia, and optimal procedures for preventing and treating these nutritional disturbances are being explored. CNRU investigators at Memorial Sloan-Kettering Cancer Center (MSKCC)/Cornell/Rockefeller are attempting to determine whether riboflavin deficiency affects subversion of T-cells by syngeneic tumors in experimental animals. Riboflavin metabolism also is being investigated in older patients who are receiving psychotropic drugs. In patients with weight loss secondary to metastatic cancer, 3-methylhistidine is being investigated as an index of protein balance. Dynamic studies of zinc metabolism in man are planned using short-lived isotopes.

As a result of malnutrition brought about by the tumor per se and/or cancer therapy, the cancer patient may become predisposed to infection. Preliminary studies at the Medical College of Georgia have demonstrated an inhibitor of neutrophil functions (chemotaxis and phagocytosis) in the serum of malnourished cancer patients. Inhibition was correlated with nutritional status and was reversed by 1 to 3 weeks of enteral nutrition support. A follow-up study will examine: 1) the prevalence of the inhibitor; 2) the correlation of inhibitor activity with numerous parameters such as nutritional status, clinical features, lymphocyte function, and incidence of infection; 3) the effect of nutritional intervention on inhibitor presence and risk of infection; and 4) additional chemical and physiologic characteristics of the inhibitor. This study will test the hypotheses that a neutrophil inhibitor is a determinant of infection in malnourished cancer patients, and that its elimination with nutritional support can lessen the infectious risks of anti-cancer therapy. The Georgia CNRU also will examine the ability of beta carotene to inhibit the development of bladder cancer in a high-risk population.

At Vanderbilt University, CNRU investigators are determining the feasibility of maintaining or increasing the body weights of patients with oat cell carcinoma. Thus far, six patients receiving home nasogastric tube feedings have either maintained their pretreatment weight or gained up to 10 percent of their body weight after 1 month of treatment.

A comprehensive investigation is being carried out on the effects of various nutrients and food products on total and high density lipoprotein (HDL) cholesterol, in conjunction with the Department of Human Oncology at the University of Wisconsin. In this study, 20 percent pure α-leukocyte interferon, pure recombinant DNA interferon, and B-fibroblast interferon were used for cancer therapy in a large group of patients whose dietary histories were obtained. With α-leukocyte and recombinant DNA interferon, both total cholesterol and HDL cholesterol decreased in patients during therapy and returned to normal when therapy was discontinued. Investigators are also working to substantiate an indication from a second study that B-fibroblast interferon may cause cholesterol levels to drop in the low density lipoprotein (LDL) fraction. Such findings would lead to somewhat different conclusions than the first study.

Nutrition and Cardiovascular Disease. Through participation as subjects in a screening program that measures plasma cholesterol, HDL cholesterol, and triglycerides, medical students at the Medical College of Georgia are becoming acquainted with the significance of lipids as a risk factor in heart disease. Approximately 34 percent of the College's 1982 senior class participated in the study, designed to detect hyperlipidemia at an early age. Once detected, diet treatment is offered to students with elevated lipid levels. Investigators are collecting the data as part of their long-term study of changes in circulating lipids in a young population.

Investigators at Chicago University's CNRU Lipids Laboratory are studying the effect of oxygenated sterol compounds, which are potent inhibitors of sterol synthesis, on a variety of mammalian cells in tissue culture. Recent findings indicate that all density classes of human serum lipoproteins bind oxygenated sterol compounds, and that lipoproteins can act as acceptors of oxygenated sterols previously inserted into red cells. However, human low density lipoproteins compete more effectively than high density lipoproteins for oxygenated sterol compounds in red cell membranes. When long-term human B-lymphocyte lines were used as a model of nucleated mammalian cells, results paralleled those for insertion of oxygenated sterol compounds in red cell membranes.

In vitro studies of the interaction between Intralipid[9] and lipoproteins, also at the Chicago CNRU, indicate that the in vivo exchange of apoproteins between chylomicrons and high density lipoproteins may be affected by the physical properties of the apoproteins, rather than the action of lipolytic (fat-splitting) enzymes. This work also has led to the successful isolation of apoprotein A-IV from human plasma in amounts sufficient for characterization of its physical properties as well as electroimmunoassay studies of its concentration in patients with a variety of lipoprotein disorders.

[9] Registered trademark for a commercial fat emulsion for intravenous administration

In other areas of cardiovascular disease research, CNRU investigators at the University of Chicago and the Medical College of Georgia have collaborated with Litton Bionetics (Kensington, MD) to help evaluate clinical and lipoprotein data obtained from a non-human primate colony. It is anticipated that these multigenerational studies, funded by the National Heart, Lung, and Blood Institute, will provide a model of arteriosclerosis that may lead to improved understanding of biological processes that control diet-induced hyperlipoproteinemia. Family groups of Rhesus characterized as hypo- or hyper-responders to a high cholesterol, high fat diet, will be evaluated to determine whether they behave similarly when fed a defined diet of less cholesterol and more saturated fat.

The CNRU at the Medical College of Georgia is participating in a multicenter collaborative trial of fenofibrate, an experimental lipid lowering drug. To evaluate long-term efficacy, safety, and tolerance of the medication, patients are enrolled in a four-phase study, which includes: 1) a pre-study to document participants' baseline lipid levels; 2) a single-blind study involving placebos; 3) a 6-month double-blind study involving fenofibrate and placebos; and 4) a 6-month, open-label study involving fenofibrate. Throughout all study phases, investigators provide diet counseling and monitor and measure participants' lipids, lipoproteins, hemogram, urinalysis, and blood chemistries. Thus far, one adverse reaction (a skin rash) has occurred.

At MSKCC/Cornell/Rockefeller, CNRU researchers are attempting to discover pathogenic mechanisms leading to hyperlipidemia in humans. Research strategies include investigating the various parameters of cholesterol homeostasis in health and disease, and developing and applying methods suitable for measuring these parameters in large numbers of outpatients. In addition, studies of the therapeutic effectiveness of TPN and of low density lipoprotein immunoabsorption in the treatment of cardiovascular disease, are in progress. An integrated studies approach, as is available through the CNRU, will be used also to determine the effects of dietary fat quality on lipid metabolism, drug metabolism, immunocompetence, prostaglandin metabolism, and other cellular metabolic systems.

Because the coastal plain of Georgia belongs to an area referred to as the "strokebelt" of the United States, investigators at the Medical College of Georgia are studying the role of minerals, such as selenium (Se), in the etiology of hypertension and renal, cerebral, and coronary vascular diseases. Epidemiological studies have shown a relationship between low Se concentrations and increased incidence of such diseases. However, in surveys of the Georgia coastal plain, where Se soil concentrations are significantly lower than in the piedmont, a lack of functional significance is suggested by evidence of glutathione peroxidase activities within the normal range. Ongoing studies will determine the association between low Se status, signs of Se deficiency, and general indices of nutrition.

Nutrition and Diabetes. The CNRU at the University of Chicago is investigating various aspects of the relationship between diabetes and nutrition. In one study, a protocol was implemented to assess the risk and possible mechanisms of hypoglycemia occurring during moderate exercise in insulin-dependent diabetics receiving a constant infusion of insulin. Results indicated that exercise did not result in hypoglycemia under the conditions used. Also, in an experiment with dogs, glucose ingestion was shown to rapidly increase the extraction of insulin by the liver, which was associated with decreased hepatic glucose output.

In another study, surface receptors for pancreatic hormones in dog and rat hepatocytes were associated with differences in qualitative and quantitative aspects of hormone-target cell interactions. Other studies indicate that the insulin resistance associated with cirrhosis may result, in part, from the decreased binding of insulin to target tissues. In particular, insulin binding by erythrocytes and monocytes was significantly lessened, probably due to a decreased number of receptors per cell that is not related to basal insulin levels.

Yet another related research project at the Chicago CNRU, involves prospective measurements of lipoprotein-apoprotein and lipid profiles in free-living, insulin-dependent diabetics. This study is part of a multicenter clinical trial to assess the effects of improved blood sugar control on metabolic and microvascular parameters.

At the MSKCC/Cornell/Rockefeller CNRU, immunological status in comparison groups of well-controlled and uncontrolled pregnant diabetics is being investigated. Studies of 3-methylhistidine as an index of protein balance in normal and diabetic subjects, particularly pregnant individuals, have been initiated. Other MSKCC investigations are examining the way in which insulin deficiency leads to hypercholesterolemia, and the hypothesis that hyperphagia in diabetic rats affects cholesterol metabolism and causes hypercholesterolemia. These studies will attempt to determine whether mechanisms for clearance of plasma lipoproteins are affected by insulin deficiency. Experimental rats in the studies will be fed chow ad libitum in order to examine the effects of diabetes on whole body cholesterol flux.

At the University of Wisconsin, CNRU assistance in the form of laboratory technology and nutritional assessment supports a study of the epidemiology of diabetic retinopathy.

Nutrition and Renal Disease. At the University of Wisconsin CNRU, a multidisciplinary study is investigating the metabolic and clinical consequences of a state of carnitine deficiency resulting from dialysis therapy. Investigators include representatives from the fields of nutritional science, nephrology, biochemistry, and exercise physiology. Patients in the study, almost all with Type IV hyperlipoproteinemia, have been on long-term hemodialysis or continuous ambulatory peritoneal dialysis (CAPD). Although their diets test adequately for carnitine intake, a precipitous drop in serum carnitine is observed during dialysis, along with a corresponding rise in carnitine concentration in the dialysate.

At Vanderbilt University, the incidence of zinc and copper deficiency in patients with chronic renal failure and the effects of zinc and/or copper supplementation are being investigated. The study involves three types of patients under three separate protocols: 1) children who will later receive renal transplants; 2) adults on hemodialysis; and 3) children and adults on CAPD. Results available from the first study suggest that the incidence of zinc deficiency is about 20 percent, and that following transplantation all children should receive zinc supplements. Outcomes from the second study suggest that adults on hemodialysis have low serum zinc, but demonstrate no substantial benefit from supplementation. Results from the third study suggest that CAPD patients may lose substantial quantities of zinc and copper, particularly as a result of peritonitis.

At the University of Chicago, a pilot study was begun recently in collaboration with nephrologists at Michael Reese Hospital, to investigate the mechanism of hypouricemia associated with TPN. The purpose of the study is to determine whether uricosuria accounts for the significant hypouricemia observed and to define the course of this phenomenon over time.

Researchers at Vanderbilt University have assessed the value of adding zinc to peritoneal dialysis fluid to prevent both zinc deficiency and subsequent infection. The addition of zinc and copper sulfate in near physiological concentrations resulted in a significant reduction of bacterial replication in effluent peritoneal dialysis fluid; the addition of both compounds created a synergistic antibacterial effect. This study should provide data to prevent zinc and copper deficiency and simultaneously decrease the infection rate in CAPD patients.

At the MSKCC/Cornell/Rockefeller CNRU, the effects of magnesium depletion on the renin-angiotensin-aldosterone system as well as on parathyroid hormone and calcium metabolism, are being studied.

Nutrition and Cystic Fibrosis. A survey of vitamin E levels and neuropathy in adult patients with cystic fibrosis (CF), is being undertaken at the University of Chicago CNRU. Included among the findings is evidence that intramuscular administration of vitamin E may improve serum tocopherol levels, in contrast to oral supplementation, which has not proven effective.

At Vanderbilt University, the effects of nocturnal nasogastric tube feedings of an elemental formula (partially digested nutrients) on the pulmonary function and nutritional status of children with CF (as determined by anthropometric and biochemical measurements), have been studied. Dramatic improvements in subjects' strength, growth, and general well-being are induced after 3 months of the feedings, and persist for an additional 2 months after feedings are discontinued.

Researchers at Columbia University CNRU, have explored the hypothesis that using short-term TPN to improve nutritional status of CF patients improves pulmonary function. Initial results indicate an improvement in respiratory muscle strength during TPN, but also a concomitant decrease in oxygen saturation, probably due to an accumulation of fluid during therapy.

Nutritional Support of Seriously Ill Patients. Prevention and treatment of malnutrition is a concern of each CNRU. Points of approach include promotion of awareness of malnutrition, identification of high-risk patients, development of clinical and laboratory assessment techniques, the development of therapy guidelines, and education of staff for delivery of quality nutritional care.

In a pilot study to devise a rapid screen for all hospital admissions at risk for malnutrition, investigators at Vanderbilt University tested two techniques. One approach involved a computerized screen of all routine laboratory tests, and the other a brief questionnaire completed by patients upon hospital admission. Project data include 37 variables for 2,476 patients. Results indicate that a computerized program available to most hospitals can be modified readily to identify patients at risk for malnutrition. In addition, a short patient questionnaire can indicate other persons who are at risk, but may not be identified through laboratory screening.

Of 10,806 patients admitted over an 11-month period and screened by the use of laboratory analysis and a brief questionnaire, 1,360 or 12 percent met 1 or more of the standard criteria for probable malnutrition. Of these, several cases of protein-calorie malnutrition were identified that would not have been diagnosed for treatment prior to the implementation of the nutritional status screening program.

Several studies have been initiated by CNRUs to measure the effectiveness of nutritional intervention in various types of patients. At Vanderbilt University, the effect of nutritional intervention on the outcome of surgical admission is being monitored. Similarly, changes in nutritional status parameters of patients admitted for coronary by-pass surgery in the 10-day period after this procedure, and correlations between these changes and post-operative complications, is being followed. To date, results indicate that nutritional status of coronary by-pass patients does not seem impaired; moreover, there is a very low incidence of complications, despite a finding that protein synthesis is depressed. Other studies have evaluated the effectiveness of parenteral nutrition on hypermetabolic burn patients at New York Hospital-Cornell Medical Center.

A study at the University of Chicago, encompassing 19 patients to date, is comparing the efficacy of semipermeable and occlusive dressings in preventing catheter-related infections, which sometimes occur with TPN. Researchers also are prospectively studying the changes in serum lipids and lipoproteins that occur during parenteral nutrition, and changes in serum triglycerides, cholesterol, free fatty acids, phospholipids, and HDL cholesterol.

Two other studies at the University of Chicago concern the mechanism of hypercalciuria, often observed with TPN. One project has assessed the effect of protein intake, while the other concerns the effect of the infusion rate (continuous vs. intermittent infusion schedule) on calcium excretion. Experimental correlation studies are also underway, and both protocols include insulin assays provided by the Radioimmunoassay Laboratory.

As part of Vanderbilt University's efforts to elucidate and understand factors leading to the development of fatty livers associated with TPN, techniques using lipophilic radiopharmaceuticals are being applied in a study of rats maintained on continuous intravenous feedings. In this way, hepatic retention can be accurately measured by external measures, rather than serum enzyme changes, which are poor indicators of early fat infiltration.

Nutrition and Growth in Infants and Young Children. The Columbia University CNRU is unique in its emphasis on the study of nutritional requirements of infants and children for normal growth and development. Primary areas of research, supported or facilitated by the CNRU, include: (1) nutrition of low birth weight (LBW) infants; (2) metabolic effects of TPN; and (3) cholesterol turnover and metabolic response of stressed patients.

Specific studies have demonstrated that in LBW infants, taurine supplementation of infant formulas maintains body taurine pools, but does not affect intestinal fat absorption as would be expected if maintenance of taurine pools increases bile salt pool size. Another study has shown that plasma and urinary cysteine concentrations are similar in both LBW infants fed formulas containing unmodified cow milk proteins (low in cysteine) and modified cow milk proteins (containing twice as much cysteine). This study also established that metabolic acidosis observed in LBW infants fed unmodified cow milk protein formulas (but not in infants fed modified cow milk protein formulas), results from accumulation of unmetabolized organic acids produced from excess amino acids.

Studies at Columbia and Vanderbilt Universities to define the requirements of amino acids for infant parenteral nutrition, have resulted in formulas that appear to produce circulating plasma concentrations of all amino acids within the normal range for infants and young children requiring TPN.

Additional studies at Columbia University in young children requiring TPN, suggest that the ratios of linoleic and linolenic acids in the parenteral lipid emulsion are considerably more important than those in dietary lipid. Even a modest amount of linolenic acid, administered parenterally, appears to inhibit the usual conversion of linoleic acid to arachidonic acid. Conversely, parenteral emulsions that contain no linolenic acid result in low levels of linolenic acid and metabolites within plasma phospholipids. Other studies will determine the effect of abnormal plasma fatty acid patterns on prostaglandin production.

At Vanderbilt University, studies have been conducted to determine copper and zinc requirements of infants and children needing special nutritional support. Results indicate that not only do disease states alter the requirements of these metals, but also that the age of the child imposes the need for substantial modifications in these levels.

Zinc deficiency was found in several preterm infants fed breast milk exclusively. Oral supplementations in the diets of lactating mothers did not appear to alter breast milk zinc content, which decreased progressively during lactation. Therefore, it appears that preterm infants need zinc supplementation when exclusively breast fed after 4 months.

Nutrition and Digestive Diseases. The mechanisms by which chronic intestinal diseases alter nutritional status and linear growth of children, also are being studied. At the University of Chicago, 60 children with chronic inflammatory bowel diseases are being followed longitudinally to correlate changes in growth velocity with nutrient intake, measures of nutritional status, and specific hormone levels (including somatomedins). Other clinical and experimental studies involve vitamin D status and calcium absorption in gastrointestinal disease, and the effect of the drugs on the intestinal hydrolysis and absorption of folates and other B-vitamins in humans.

Investigators at MSKCC/Cornell/Rockefeller are testing the hypothesis that growth failure associated with the treatment of childhood malignancies, involves absorption defects in the gastrointestinal tract as well as significant derangements in the cellular metabolism of essential nutrients.

Nutrition and Metabolic Studies. At the University of Chicago CNRU, stable isotope and breath tests are being used to monitor the metabolism and energy requirements in man. Studies conducted in the Stable Isotopes Laboratory include fatty acid oxidation in children with Reyes Syndrome, oxidation of lactic acid in man during exercise, fat absorption in a patient with abetalipoproteinemia, and validation of anthropometric measurements for estimating lean body mass against total body water in obese adolescents. Total body water is being measured in institutionalized children with cerebral palsy and myelodysplasia.

Research continues on the validation of the doubly-labeled water method for determination of energy expenditure, with extremely promising results from subjects whose analyses are complete. In a study of two subjects, analyses are underway to assess energy expenditure/balance during nutritional support in children with Chron's disease.

In studies involving measurement of $^{13}CO_2$ excretion in the breath as an index of hepatic metabolism, assessments are continuing of the aminopyrine breath test for measuring hepatic cytochrome activity and of the caffeine breath test for assessing cytochrome P-450. In addition, the phenacetin breath test is being evaluated as a possible measure of hepatic blood flow. In a study encompassing five normal young men, five normal young women, and one obese man, the influence of hepatic amino acid metabolism on appetite regulation has been observed. The protocol compares qualitative and quantitative changes in circulating plasma amino acids for 5 hours after oral intake of 60 grams of beef protein hydrolysate.

Lipid metabolic parameters are being measured in a study of the effectiveness of estrogen replacement therapy in post-menopausal women. Other investigations focus on Vitamin D absorption and metabolism and vitamin D status and calcium absorption, as discussed previously.

At Vanderbilt University a project has been initiated to determine the effects of fatty acid deficiency, the relationship between fatty acid levels and micronutrients, and the possibility that a deficiency of copper or zinc might alter the rate of conversion of linoleic to arachidonic acid. Many patients exhibit deficiencies in a number of micronutrients.

In an epidemiologic and clinical examination of the link between anemia and serum cholesterol at the University of Wisconsin, a significant positive correlation has been found between hematocrit and serum cholesterol levels. A study also has been conducted to determine whether serum cholesterol and HDL levels in patients with hereditary spherocytosis, are significantly different from siblings who are free of anemia.

A concerted effort is being made to elucidate the factors leading to complications from TPN, including the development of fatty livers. Core laboratory research support is also being given to the study of nutritional variables in a series of patients with anorexia nervosa.

Using a serotonin-depleting enzyme, investigators at MSKCC/Cornell/Rockefeller are conducting animal studies to explore the role of serotonin in regulating appetite and satiety.

Nutrition Research Pilot Studies. CNRUs are able to provide limited funds for short-term projects that explore the feasibility of new areas of study and provide new research leads. The costs for such projects are limited to 10 percent of the annual CNRU budget. Each Unit director is responsible for establishing an internal review of pilot project proposals and for overseeing the use of these funds to insure the quality of research. The list of CNRU pilot studies in Table 1 reflects the multidisciplinary nature of nutritional science in the Units.

Table 1
CNRU Pilot Studies

Study of malnutrition in hospitalized patients

Development of radioimmunoassay procedures for determination of a variety of nutrients in biological samples

Computer-assisted nutrition assessment

Evaluation of the metabolic effects of interferon therapy on various cancers

Role of starvation and serious illness on depletion of fibronectin

Hypoglycemia when TPN therapy is discontinued

Determination of calcium and bone metabolism in home TPN patients

Determination of the effect of dietary fat on immune functions

Development of short-lived isotopes of zinc for human studies

Selenium as a component of TPN solutions

Net acid balance in renal acidosis

Pancreatic function in patients with cystic fibrosis

Plasma amino acid and phospholipid fatty acid patterns in low birth weight infants

Changes in plasma and muscle-free amino acids during stress and convalescence

Selective amino acid requirements of leukemic cells

Evaluation of selenium, α-tocopherol, and lipids in blood of supplemented and unsupplemented human subjects

Effect of human maternal dietary fat intake on fetal lung maturation

Core Research Facilities. In the evaluation of the initial applications for CNRUs, special consideration was given to institutions where several clinical nutrition research projects were already receiving support from NIH and other sources. Thus, the CNRU program was not intended to provide full support for participating investigators. In contrast, the initiative does fund core laboratory facilities, which are designed to lend support, strengthen, and extend nutritional emphasis in existing research projects, and to stimulate the development of new multidisciplinary research projects involving clinical nutrition.

While all CNRUs maintain laboratory and clinical research facilities under the direct control of cooperating scientists, such facilities and their capabilities vary considerably from institution to institution. Some Units have new laboratories, while others utilize pre-existing facilities at the institutions. When certain unusual tests are required, other laboratories within or outside the parent institution may be utilized. Items listed in Table 2 are representative of the functions that are needed, and are generally available, for scientists engaged in nutrition-related research at these institutions.

Table 2

Functions of Core Research Facilities

Clinical nutritional assessment

Nutrient analyses, i.e. vitamins, minerals, trace minerals, proteins, amino acids, etc.

Lipid analyses

Biological sample assays

Metabolic assessments

Data management and analyses

Immunology testing

Mass spectrometric evaluation

Biophysical assessments

Stable isotopes

Radioimmunoassay

B. Research Training in Nutrition

While each of the CNRUs has made a commitment to provide opportunities for training experiences for students and young investigators, the nature of the programs vary widely from institution to institution. Those CNRUs that have strong core labs, large, varied, and well-characterized patient populations, and interested, involved house officers have developed highly successful training programs. These same CNRUs also have been successful in obtaining funds from industry or foundations for support of research training.

Trainees may become associated with a CNRU and its related laboratories through various courses of study, such as baccalaureate, master's, Ph.D., M.D., and postdoctoral programs, medical and surgical residencies, and dietetic internships. In order for trainees to emerge from these experiences as competent clinical and/or academic nutritionists, qualified to take speciality boards, a structured curriculum is desirable. Training programs include assigned readings, seminars, and conferences dealing with intermediary metabolism, requirements of all nutrients, clinical and biochemical manifestations of all recognized nutrient deficiency or toxicity syndromes, and nutritional supportive care. CNRUs with associated core laboratories and clinical services possess a unique capability to develop such curricula.

Through their Nutritional Support Services and training programs in hospitals with highly-motivated house officers, CNRUs appear to be attracting a new generation of young physicians, motivated toward research in nutrition and metabolism. It is expected that these trainees will form a link between the scientists in the core laboratories and patients receiving treatment.

There is little question that the CNRUs have stimulated the staff and faculty of all participating institutions, primarily through interdisciplinary interactions related to patient care. The fruits of these efforts, although not yet fully expressed, are expected to be substantive.

C. Nutritional Support Services

Among the requirements of a Clinical Nutrition Research Unit (CNRU) is a strong Nutritional Support Service, funded by sources other than the CNRU. Such Services help promote the assessment, maintenance, and improvement of the nutritional status of both in- and outpatients.

Model CNRU Nutritional Support Services are staffed by physicians with advanced training in nutrition and highly motivated residents and/or fellows. Linked to comprehensive nutrition assessment laboratories, which provide rapid answers to clinical questions, the Services engage in the following types of activities:

- Collection and analysis of data on the prevalence, types, and predisposing risk factors of nutritional disorders in various patient groups;
- Development of preventive measures for nutritional disorders;
- Delivery of optimal nutritional diagnosis and support; and
- Research in various nutritional disorders and treatments.

At most CNRUs, the Nutritional Support Service director is assisted by a multidisciplinary team comprised of clinical and/or research dietitians, registered nurses, pharmacists and/or pharmacy technicians, and one or more medical or surgical fellows, residents, or medical students. The team assesses patients' nutritional status upon request from individual physicians or according to hospital standing orders, and recommends nutritional therapy. It also assists in the diagnosis of nutritional problems and ensures adequacy and tolerance of the prescribed nutritional support. Direct responsibility for daily care and management of the patient, however, remains in the hands of each patient's primary physician and staff nurses.

Many hospitals affiliated with CNRUs have specially trained hyperalimentation teams to plan, prepare, and distribute solutions, and supervise patients sustained by TPN and enteral nutrition. The team trains selected patients and/or family members to continue TPN or enteral feedings at home, thereby helping to contain hospital costs. The variety of responsibilities that hyperalimentation teams often assume are described in Table 3.

Table 3
Range of Hyperalimentation Team Responsibilities

Inpatient TPN --- planning, preparing, and distributing solutions, and supervising patients on such treatment

Home TPN --- training professional staff as well as patients and families about the formulas and their administration

Peripheral parenteral nutrition --- recommending appropriate nutritional therapies for patients who are capable of ingesting 30 to 50 percent of their normal intake

Oral and tube feedings --- recommending appropriate nutritional therapies for in- and outpatients, and working with dietitians who train outpatients in formula preparation

Professional and public education --- training medical students, physicians, nurses, dietitians, pharmacists, patients, and families about nutritional therapies and the role of the team

Consultation --- providing assistance to physicians and other health professional on request

While most CNRU Nutritional Support Service consultations are oriented toward patients receiving TPN or enteral nutrition, individuals with other nutrition-related problems such as anorexia nervosa, bone marrow transplants, cancer, burns, and taste disorders also may be seen. Patient referrals originate from all hospital departments. That the number of consultations have been increasing in all CNRUs since their inception is evidence that more and more health professionals recognize the valuable contribution of Nutritional Support Services in the delivery of quality patient care.

In addition to patient consultations, Nutritional Support Services promote the delivery of quality health care through the development of hospital standards and audit procedures for nutrition-related problems. The Services often provide input into the revision of hospital dietary manuals, which outline essential components of nutritional assessments, selection and insertion of feeding tubes, safeguards against potential complications, guidelines for the selection of formularies, and other patient care procedures. They may assist in new product and equipment evaluations, the design of nutrition consultation flow sheets or other documentation forms, and formal and informal educational activities for professionals and the public.

By their involvement in nutrition research, CNRU Nutritional Support Services help attract new investigators. Some studies involving Support Service teams include malnutrition, cancer, cystic fibrosis, hypercalciuria associated with TPN, and prevention of catheter-related infections. At many Units the research is assisted by computers, which identify suitable patients for particular studies, screen patient admissions for nutritional disorders, and summarize patient response to nutritional therapies.

As an example of the use of computers by a CNRU Nutritional Support Service, patients admitted to Vanderbilt Hospital are screened for malnutrition (and associated risk factors) by computerized retrieval of relevant laboratory data and an admission questionnaire. When a patient is identified as malnourished or at risk of becoming malnourished, the chart is reviewed by a member of the Nutritional Support Service, who then notifies the patient's physician of the problem and offers consultation. In addition, pertinent data are sent to the Dietary Department. This system, supported by all hospital departments, has made it possible to identify early or occult malnutrition for approximately $.05 per adult admission in a large hospital population.

At the University of Chicago, computer applications also are important adjuncts to the Nutritional Support Service's efforts in patient care and research. One package of programs, written for persons with little or no previous computer operations experience, enables the team to track all patients seen by the Service; patient data are entered by a clinician on the University's DEC-20 computer. This system not only enables pertinent patient information to be quickly located by the primary physician and nutrition support team, but also permits review and identification of patients who meet specific study criteria. Another program, written for a microcomputer, keeps detailed progress records for all patients followed in the home parenteral nutrition program. The system provides a one-page summary of a patient's current status, medications, hyperalimentation solutions, and his/her five most recent laboratory values and weight.

Most recently, the Chicago CNRU Nutritional Support Service has become involved in a protocol evaluating duration and quality of life in terminally ill cancer patients with intestinal obstruction, who receive intravenous maintenance solutions or TPN. Subjects are those for whom anti-neoplastic treatment has failed or for whom no further medical or surgical treatment is available for the underlying malignancy.

Another CNRU Nutritional Support Service actively engaged in the study and treatment of cancer patients is MSKCC/Cornell/ Rockefeller. Considered one of the pioneer programs in the country, the team includes attending physicians from both the Nutrition Service and the Clinical Physiology and Renal Service, nurses supported by the Department of Nursing, pharmacists, dietitians from the Nutritional Support Service Kitchen, two medical fellows, one surgical fellow or resident rotating on a monthly basis, and periodic medical residents and gastroenterology fellows from Memorial Hospital. In addition to cancer-related nutritional problems, the team deals with obesity, anorexia nervosa, taste disorders, drug-induced nutritional deficiencies, lipid disorders, endocrine-nutritional problems, and nutritional problems of aging.

Contributing greatly to the success of the MSKCC/Cornell/ Rockefeller Nutritional Support Service has been the Nutrition Support Kitchen. In 1981, the Kitchen provided assistance to more than 1,670 in- and outpatients. The responsibilities of Department dietitians include: evaluation of intake and acceptability of formulations; supply of sterilized food for patients with severely depressed bone marrow; preparation and distribution of regular hospital tube feedings and feeding formulas; and preparation of special diets for patients participating in metabolic studies. In addition to training patients and professionals, the Department conducts special patient surveys, designs and/or revises patient documentation forms, and develops special nutrition protocols to improve patient care. Each year, health professionals from all parts of the United States as well as foreign countries visit the Support Kitchen for observation and on-site training and to conduct special projects.

At the University of Alabama in Birmingham (UAB), the Clinical Nutrition Team and Support Service provides automatic consults for patients in the Pulmonary Service requiring ventilator-assistance, and for those admitted to the Burn or Bone Marrow Transplant Services. The clinical nurse specialist and dietitians visit Support Service patients on a daily basis; work rounds by the entire team are conducted three times per week. In addition, weekly outpatient clinics featuring a home-TPN service, are held for both adult and pediatric patients. Nutrition consultation is also provided at a weekly clinic held by the Family Practice Department clinic. Team members contribute to studies involving hospital malnutrition and its prevention, the role of nutrition in cancer, feeding problems, and other CNRU-sponsored investigations.

The presence of the CNRU has had a significant impact on maintaining the formality of the Nutrition Support Service at UAB, since it funds 25 percent of the involved staff. In addition, it has provided impetus for the creation of two additional Support Service teams: one for the UAB Pediatric Service, funded 50 percent by the CNRU; and the other for the Veterans Administration Hospital, supported totally by that institution.

D. Nutrition Education Activities

The presence of CNRUs at many institutions has strengthened and enhanced support for nutrition education of professionals as well as the general public. Funded by sources other than the CNRU, the Units have been active in the design and presentation of formal educational programs and continuing education workshops and symposia for health professionals. Nutritional Support Service teams have provided many excellent opportunities for students and residents to observe and participate in the active management of patients with nutritional disorders. CNRU activities in patient and public information include nutrition hotlines, nutrition assessment workshops, annual seminars, audiovisual productions, newsletters and brochures, radio talk shows, and community outreach to special segments of the population.

Formal Educational Programs. CNRUs participate in the design and preparation of nutrition courses and lectures for: medical, nursing, dietetic, dental, and dental hygiene students; non-medical graduate students; house staff; and postdoctoral fellows. Although all CNRUs offer some instruction in principles of nutrition to medical students, the amount of time devoted to this subject varies and is often below the ideal. In most instances, nutrition information is offered in elective courses or presented as a small component of a broader subject area. In spite of the relatively short existence of CNRUs and the difficulty of modifying already crowded medical school curricula, however, most Unit faculty have made noteworthy progress in better preparing medical students in human nutrition. Table 4 provides a summary of the various nutrition education opportunities for medical students available at the participating institutions.

One exemplary program for nutrition education of medical students, offered by the University of Alabama at Birmingham (UAB), provides 50 required contact hours of nutrition instruction for students in their first year. Taught by eight physicians and four non-physician instructors, the course is thought to be the largest nutrition offering required in any medical school curriculum in the United States. Although the majority of the nutrition hours were required by UAB prior to the CNRU grant, the award has contributed both directly and indirectly to the support of many faculty members who lecture in these courses.

In addition, medical students in their fourth year at UAB can elect month-long clinical clerkships in nutrition. Opportunities are also available for residents to rotate through clinical nutrition; during the period from October, 1979 through February 1981, 19 residents in Internal Medicine participated in the 1-month offerings. Both the medical students and the residents learn by participating with the Nutritional Support Services team in the active management of patients in the hospital and ambulatory center. Moreover, they are exposed to workshops and seminars, journal clubs, and hospital grand rounds, in which Nutritional Support Service physicians play an active role.

Table 4

Nutrition Education Opportunities for Medical Students

Institution	Total Hours of Nutrition-Related Instruction Offered During Basic Science Years	Separate Nutrition Course Or Integtrated With Other Subjects	Required Or Elective Course	Clerkships In Clinical Nutrition (Yes/No)	Rotations In Clinical Nutrition (Yes/No)	Number of Residents Taking Clinical Nutrition Rotation In 1982
Columbia University College of Physicians and Surgeons						
Medical College of Georgia						
Memorial Sloan-Kettering Cancer Center/ Cornell/ Rockefeller						
University of Alabama at Birmingham						
University of Chicago						
University of Wisconsin						
Vanderbilt University						

In addition to its offerings for medical students, the Alabama Department of Nutritional Sciences offers more than 15 courses to students in dentistry, dental hygiene, dietetics, nursing, and graduate studies. Dental students are required to complete a 25-hour course incorporating broad and basic principles of nutrition sciences. For the graduate student, Department faculty members, some of whom receive a portion of their salary from the CNRU grant, provide support in thesis research. The opportunity for graduate students to interact with graduate thesis committees and faculty members from other departments, has proven to be a richly rewarding experience.

Education and training activities at the Medical College of Georgia also include formal courses for students in medicine and the allied health professions. Also available are special lectures given by CNRU staff during Grand Rounds and at monthly medicine noon conferences; a distinguished lecture series; clerkship and preceptorships for medical students and physician's assistants; and clinical rotations for residents. For medical students, instruction in nutrition begins during orientation to medical school, followed by 28 hours of didactic instruction during Phases I and II and the Medical Clerkship. A month-long elective is available for third and fourth year students that involves participating in didactic sessions, working with the Nutritional Support Services team, attending lipid and nutrition clinics, and interacting in general with all activities of the CNRU. An interesting feature of Georgia's medical school training is that first-year students receive skeleton notebooks to which handout material from each subsequent nutrition exposure is added. By the completion of formal medical training, each student has a valuable collection of reference materials and a syllabus, which can be used during his/her postgraduate career.

A number of CNRUs are involved with graduate and post-graduate educational opportunities. The University of Wisconsin offers both master's and doctoral degree training programs in clinical nutrition; it also offers medical students an M.D.-Ph.D. track with a research emphasis in clinical nutrition. After two years of medical school in the Independent Study program (with graduate school courses in Nutritional Sciences) and a year of junior clerkships, fourth year students devote time to completion of their thesis, which usually extends an additional year.

The University of Chicago's graduate educational opportunities include a master's program in clinical nutrition and a doctoral program in human nutrition and nutritional biology. The master's program, under the direction of a CNRU faculty member, offers both a research and a clinical tract. At the Medical College of Georgia School of Graduate Studies, a master's program in clinical nutrition is under development.

In addition to postgraduate study programs, CNRU faculty actively participate in formal allied health professions training. At Vanderbilt University, CNRU funding has made it possible to offer a nutrition course to nursing students. In 1981, the creation of a joint appointment position enabled a CNRU clinical specialist to devote 30 percent of her effort to teaching "Introduction to Human Nutrition" in the School of Nursing, and 70 percent to the CNRU. At the University of Wisconsin, CNRU faculty supervise the undergraduate dietetic program, present a course in human nutrition for the physicians' assistants program, and lecture to medical technologists on various blood disorders related to diet.

Professional and Public Education. CNRU efforts in disseminating nutrition information to health professionals in the field and the public have been innovative and varied. In addition to presenting workshops, seminars, and lectures, CNRU staff edit or submit chapters to nutrition textbooks; write newsletters, pamphlets, and brochures; and issue press releases and maintain close contact with the media. Some Units have produced audiovisual programs on nutrition topics for broadcast to the general public, while others are involved with local schools, health departments, clinics, or community service programs.

At the MSKCC/Cornell/Rockefeller CNRU, the Nutrition Information Center serves as a central resource for gathering and disseminating accurate and current information on clinical nutrition, nutrition research, and general nutrition to scientists, clinicians, and allied health professionals working in CNRU-affiliated hospitals. With a grant from the William H. Donner Foundation, this model education resource was initiated in June, 1981. Center staff include a part-time director with 14 years of experience in nutrition, a part-time nutritionist, and volunteers. An advisory board composed of senior staff of the Food Service and Dietary Departments provide direction to its activities, which include:

- Publication of a bimonthly four to six page bulletin, Current Concepts and Perspectives in Nutrition, which discusses controversial and/or new issues in the field and is distributed to participating institutions;

- Publication of a bimonthly "Nutrition Calendar of Events," listing seminars, lectures, workshops, and courses in nutrition being offered in participating institutions and the metropolitan area;

- Publication of a patient education booklet series, the first of which deals with nutrition and treatments for head and neck cancer;

- Publication of two nutrition directories: one directory lists clinical programs, research activities, and educational programs at the participating institutions, and the other presents nutrition services, counseling, and resource information for the New York City area;

- Operation of a "Nutrition Hotline," which answers nutrition-related questions, provides educational materials, makes referrals, and assists in program planning; and

- Establishment of a nutrition library for professional staff and students in the medical community.

CNRU faculty at MSKCC/Cornell/Rockefeller publish texts for use in training programs and continuing education. Dr. Richard S. Rivlin, the CNRU Director, serves as the Chairman of the Editorial Board of a series of volumes titled, Contemporary Issues in Clinical Nutrition. Published three times per year by Churchill Livingstone, Inc., the series reviews indepth topics of current interest and importance in nutrition. Titles published in 1981 and 1982 include Controversies in Clinical Nutrition, Nutrition and Gastroenterology, Nutrition and Surgery, Nutrition and Hematology, Obesity, and Drug-Induced Nutritional Deficiencies Relating to Aging. Every effort is made to involve CNRU staff members as editors and contributors to the series.

A widely-known education and training event sponsored as a joint activity of the Medical College of Georgia and Vanderbilt University, is the annual continuing medical education program "Frontiers in Nutrition." Each fall, a 2-day clinical nutrition conference is held at Hilton Head Island, South Carolina, attracting both physicians and allied health professionals. Faculty from the Georgia and Vanderbilt CNRUs join with eminent guests to present the program. Co-sponsors of the program have included the American Society for Clinical Nutrition, the Georgia Dietetic Association, and the American Society for Parenteral and Enteral Nutrition.

In collaboration with the Georgia Institute for Human Nutrition, Georgia CNRU staff publish Food for Thought, a bimonthly newsletter distributed to nearly 2,000 individuals. Special events, such as Prevention Day and the annual Heart Healthy Luncheon, provide still other avenues for faculty involvement in continuing education of health professionals.

Many CNRUs utilize electronic media to deliver nutrition information to diverse and geographically-dispersed populations. As one example, the Columbia University CNRU presents a 90-second daily radio program, "The Columbia Nutrition Bulletin." Currently the program is broadcast on 180 stations, including the Armed Services radio network, and reaches an audience of approximately two million people.

Involvement with community projects is also a major activity at various CNRUs. Faculty at the University of Chicago assist the local health department and local school systems to conduct nutritional assessments of pregnant adolescents. At the University of Wisconsin, staff operate screening and education programs in Portage, a community with a higher incidence of heart disease than the remainder of the state. CNRU investigators at this site are studying the population's risk factors related to cardiovascular disease, and are providing dietary counseling and instruction, when indicated. At the University of Alabama, CNRU staff educate faculty and students in kindergarten through fourth grade about nutrition; conduct nutrition assessment workshops; provide guidance to physicians from local hospitals in methods of initiating a Nutritional Support Service; and assist in the establishment and evaluation of food service programs for the elderly and the handicapped in the Birmingham area.

IV. COORDINATION AMONG CNRUs AND OTHER FEDERAL NUTRITION CENTERS

To foster integration of, and interaction between CNRUs, NIH sponsors an annual meeting of CNRU Directors during which research progress and future research needs are discussed. Representatives from various institutes also are invited to report on their needs and priorities in nutrition.

At the second annual meeting of the CNRU Directors in 1981, participants identified three areas in particular with potential opportunities for institutional collaboration:

- laboratory methodology and services;
- education and outreach activities; and
- clinical nutrition research.

To promote collaboration in clinical nutrition research, the CNRU Directors singled out examples of studies for which joint projects may be appropriate, particularly when they involve inadequate numbers of patients at a single institution. Concerning collaboration in laboratory methodology and services, the Directors agreed to standardize assays being performed in more than one laboratory, so that comparable results could be obtained. Three assays, which in the Directors' consensus are meaningful clinical measurements of nutritional status, were selected for standardization: (1) plasma and red blood cell folate, (2) transketolase, and (3) erythrocyte glutamine pyruvate transaminase (EGPT).

Focusing on education and outreach activities, the Directors explored numerous ways to facilitate interactions among their centers and to increase the input of CNRUs in nutrition education nationwide. Ideas ranged from scheduling exchange visits among CNRU staff who would provide consultation and formal lectures, to circulating CNRU progress reports among the centers. It was also suggested that reading lists, reference materials, newsletters, public information booklets, and resources used in student and post-graduate courses could be collected by a NIADDK staff member and exchanged. CNRU staff were encouraged to submit papers and serve as editors of single volumes of Contemporary Issues in Clinical Nutrition or other publications.

At the 1982 Annual Conference of Federally Supported Human Nutrition Research Units, sponsored by the Joint Committee on Human Nutrition Research, CNRU Directors not only summarized their progress related to these areas of Unit coordination, but also were briefed on a variety of other government-sponsored research programs. In addition to various officials from the Department of Health and Human Services (HHS), conferees in attendance represented the Department of Agriculture, Department of Defense, the Veterans Administration, and the Agency for International Development. More than 20 presentations were given during the 2-day period.

Among the discussions of particular interest to the CNRU Directors, were those nutrition-related projects also sponsored by HHS. In the NIH Intramural Research Program, nine institutes, including NCI and NIADDK, sponsor nutrition-related research; projects include prospective randomized clinical trials, animal studies, ongoing long-term studies, longitudinal studies on the metabolism of nutrients, longitudinal studies on food toxicity in healthy volunteers and patients with various disease states, and numerous others. Nutrition research at the FDA Division of Nutrition focuses on nutritional quality and safety, nutrient analysis, and clinical nutrition assessment in areas where changes are needed to successfully reach national nutrition objectives. In another FDA activity, the Division of Consumer Studies, both consumer and market research are conducted by using surveys and experiments that involve direct contact with the public and food manufacturers.

CNRU Directors also devoted time during the 1982 annual meeting to explore still other ways in which intra-CNRU cooperation could be enhanced. The Directors agreed to begin rotating meeting sites among the CNRUs, focusing on a single problem or topic in which the Unit hosting the event has expertise. The first CNRU site meeting is tentatively scheduled for Fall 1983 at the University of Chicago. The Directors noted, however, that these and other coordination efforts continue to be expensive for the Units, whose overall budgets are being curtailed.

In other efforts to encourage communication between CNRU investigators and to facilitate the monitoring of CNRU grants, an on-line computerized project information retrieval system was funded and developed in 1982 through the NCI's Diet, Nutrition, and Cancer Program (DNCP). This information management system data base is arranged by subprojects within CNRUs and is indexed according to the Joint Subcommittee for Human Nutrition Research's (JSHNR) 3 major classes and 34 categories[10]. Each project description contains:

- name of the principal investigator;
- project title;
- key words;
- project number;

---

[10] Classification System for JSHNR Data Retrieval of Nutrition Research Project was approved at the JSHNR meeting on June 18, 1981, and revised February 8, 1982. Clarifying comments and "other" categories were added June 8, 1982.

- grant number;
- name of the grant Principal Investigator;
- grant institution, department, address, and telephone number;
- grant title; and
- laboratory assay information.

This interactive, conversational system operates at the NIH Division of Computer Research Technology (DCRT) computer center. Search results, available to CNRU staff members, may be listed at local terminals or printed on the high speed printers at DCRT.

Still another type of activity that has fostered interaction between CNRUs and other Federal nutrition research centers has been Unit site visits. In response to the Comptroller General's Final Report, Progress Made in Federal Human Nutrition Research Planning and Coordination; Some Improvements Needed, scientists from the USDA and VA nutrition centers were invited to assist in evaluation site visits of three CNRUs in June/July 1982: Columbia University, MSKCC/Cornell/Rockefeller, and the Medical College of Georgia. Although the remaining four sites were visited prior to release of the Comptroller General's Report, all future site visits involving scientific consultants are expected to include scientists from USDA, VA, or other nutrition centers and civilian visitors.

V. SUMMARY

The NCI and NIADDK currently support seven Clinical Nutrition Research Units (CNRUs), which are designed to create or strengthen nutritional research, training, and education through coordinated effort, intellectual stimulation, and use of shared resources. Since the first CNRU awards in 1979, the Institutes have invested a total of $9,302,831 in the program; another $2,729,679 is projected to be spent in FY 1983.

As a result of the CNRU initiative, it appears that nutrition is being effectively integrated as a component of a broad spectrum of research projects. Emphasis on shared facilities, particularly core nutrition laboratories, has proven especially valuable in increasing the number of multidisciplinary studies. An average of 23 new clinical nutrition research protocols (ranging from 7 to 40) are now active at each Unit. Studies include the role of nutrition in cancer, cardiovascular disease, diabetes, renal disease, cystic fibrosis, seriously ill patients, growth in infants and children, and human metabolism.

Research at the participating institutions in clinical nutrition and related areas, has been expanded through CNRU support of pilot studies and new investigators. At various sites, researchers are exploring the feasibility of conducting full scale studies in computer assisted nutrition assessment, pancreatic function in patients with cystic fibrosis, radioimmunoassay procedures for determining nutrients in biological samples, and other nutrition-related areas of interest. With CNRU temporary salary support, new investigations have undertaken clinical nutrition research, complementary to activities of the group. The new investigator awards are expected to yield a meaningful number of well-trained clinical nutrition research scientists in the near future.

Each CNRU has made a commitment to provide training experiences for students and young investigators at various levels. Opportunities among the Units range from baccalaureate, master's, Ph.D., M.D., and post-doctoral programs, to medical and surgical residencies and dietetic internships. Trainees in these programs provide a valuable link between scientists in core laboratories and patients undergoing treatment.

Nutritional Support Services, comprised of multidisciplinary teams of health professionals, help promote the assessment, maintenance, and improvement of the nutritional status of both in- and outpatients. While most Service consultations involve adult and pediatric patients receiving TPN or enteral nutrition, individuals with anorexia nervosa, bone marrow transplants, cancer, burns, taste disorders, and other nutrition-related problems are also seen. That the number of consultations have been increasing in all CNRUs since their inception, is evidence that more and more health professionals recognize the valuable contribution of Nutritional Support Services in delivering high quality patient care. In addition to consultations, team members often participate in the design and implementation of research protocols, hospital standards, and audit procedures.

The presence of CNRUs at many institutions has strengthened and enhanced nutrition education of health professionals as well as the general public. Formal education programs for medical, dental and allied health professional students include required and/or elective courses in basic and advanced principles of nutritional sciences. Independent study programs, clerkships, preceptorships, clinical rotations, and special lectures by CNRU staff complement traditional classroom instruction. To disseminate nutrition findings to physicians, other health professionals, and lay persons in the community, faculty organize workshops and seminars; write/edit newsletters, pamphlets, and chapters in textbooks; produce audiovisuals; and maintain close contact with the media.

The NCI and NIADDK regularly monitor and evaluate the progress of CNRUs in reaching their goals through Unit reports, site visits, and annual meetings. Joined by non-NIH clinical nutrition scientists, Institute representatives visited each of the Units after approximately 20 months of operation. Annual meetings of CNRU Directors to exchange research findings and other Unit highlights, have contributed greatly to the integration and cooperation that characterizes the entire CNRU program.

Appendix A

FUNDING HISTORY OF CLINICAL NUTRITION RESEARCH UNITS

Center Director & Location	FY 79 Actual	FY 80 Actual	FY 81 Actual	FY 82 Actual	FY 83 Actual
C. E. Butterworth, Jr., M.D. Professor and Chairman Department of Nutrition Sciences The University of Alabama in Birmingham University Station Birmingham, AL 35294	231,489	203,518	213,429	268,726	269,257*
Elaine B. Feldman, M.D. Chief, Section of Nutrition Department of Medicine Medical College of Georgia Augusta, GA 30912	---	257,113	297,864	272,764	279,391*
Harry L. Greene, M.D. Associate Professor of Pediatrics Head, Division of Gastroenterology Vanderbilt University Medical School Nashville, TN 37232	407,828	398,909	317,076	362,928	388,413*
Alfred E. Harper, Ph.D. Professor of Medicine and Nutritional Sciences Earl Shrago, M.D. Professor and Chairman Department of Nutritional Sciences Clinical Nutrition Center University of Wisconsin - Madison 150 University Avenue Madison, WI 53706	300,127	00.000**	230,647	195,268	239,053

Center Director & Location	FY 79 Actual	FY 80 Actual	FY 81 Actual	FY 82 Actual	FY 83 Actual
Richard S. Rivlin, M.D. Chief, Division of Nutrition Memorial Sloan-Kettering Cancer Center 1275 York Avenue New York, NY 10021	---	180,105	285,847	335,573	419,033*
Irwin H. Rosenberg, M.D. Professor of Medicine Department of Medicine Division of Biological Sciences University of Chicago 950 East 59th Street Chicago, IL 60637	438,740	447,596	474,475	109,271***	515,516
Myron Winick, M.D. Professor of Pediatrics Director, Institute of Human Nutrition Columbia University College of Physicians and Surgeons 630 West 168th Street New York, NY 10032	---	442,673	569,166	574,314	619,011*
TOTAL	1,378,184	3,417,299	2,388,504	2,118,844	2,729,674

* Estimated/projected amount
** Extended without additional funds into next fiscal year
*** Extended with three months support into next fiscal year

APPENDIX B

CNRU RESEARCH PROJECTS

Vanderbilt University:

Schenker, S. - Nutritional Factors in Hepatic Encephalopathy
Greene, H.L. - Optimal Intake of Zinc and Copper in Pediatric Patients Requiring Total Parenteral Nutrition or Defined Formula Diets
Meng, H.C. - Micronutrient Metabolism in Patients with Essential Fatty Acid Deficiency
Oldham, R. - Evaluating the Efficacy of Total Parenteral Nutrition as an Adjunct to Combination Chemotherapy in Advanced Measurable Small Cell Anaplastic Lung Carcinoma
MacDonell, Jr., R.C. - The Effects of Chronic Uremia and Dialysis in Vitamin and Trace Mineral Homeostasis in Children and Adults
O'Leary, J.P. - Nutritional Assessment of Surgical Patients
Folk, M.C. - Pilot Project - Identification of Malnutrition in the Hospitalized Population

Medical College of Georgia:

Merchant, H.W. - Nutritional Factors in the Prevention or Cure for Recurrent Ideopathic Oral Ulcers
Middleton, H. - Intestinal Absorption of Water-Soluble Vitamins
Smith, D. - Folic Acid Interactions with Anti-convulsants
Gallagher, B. - Studies in the Clinical Pharmacology of Valproic Acid
Hull, D.S. - Vitamin E Deficiency and Rabbit Corneal Endothelium Sensitivity
Hommes, F. - Dietary Treatment of Phenylketonuria in Rats
Brubaker, L. - Bone Marrow Reserves, Neutrophil Function, and Serum Complement as Related to Protein - Caloric Malnutrition in Cancer Patients
Singh, M. - Protein Synthesis and RNA and DNA Metabolism of the Pancreas in Chronic Administration of Ethanol and of Deficiency of Pyridoxine, Riboflavin, Thiamin, and Folate

Chaudhary, B.	- Obesity and Sleep Apnea
Feldman, E.B.	- Dietary Factors in the Pathogenesis of Atherosclerosis
Feldman, E.B.	- Effects of Feeding Different Chain Length Fatty Acids on Body Lipids
Linder, C.W.	- Effects of Physical Conditioning on Serum Lipid Levels in Adolescent Children
Strong, W.B.	- Development of a Model of Preventive Cardiology Curriculum for Medical Schools
Hames, C.G.	- Epidemiologic Factors in Cardiovascular Disease
Fadel, H.E.	- Quantitative Assessment of Protein Nutrition and Metabolism in Pregnancy
Roesel, R.A.	- Effect of Diet and L-Tryptophan on Behavior in Unrelated Adult Phenylketonurics

University of Wisconsin:

Greger, J.L.	- Human Metabolism and Trace Elements
Linkswiler, H.M.	- Protein Intake and Calcium Metabolism
Shrago, E.	- Serum Carnitine in Health and Disease
Elson C., Greger, J. & Shrago, E.	- The Response of HDL to Dietary Carnitine and Vanadium
Shrago, E., Elson, C.	- Lipid Metabolism in Human Adipose Tissue
Marlett, J.A.	- Nutrition and the GI Tract
Welling, P.G.	- Drug Nutrient Interaction
Chesney, R.W.	- Use of 1, 25 Vitamin D in Steroid-Induced Osteopenia
Voichick, J.	- Evaluation of Nutrition Programs and Techniques to Teach Nutrition
Azen, E.A.	- Epidemiologic Study for a Possible Relationship Between Dental and Periodontal Disease and Inheritance Patterns of PB and PR Proteins
Odell, G.	- The Irritable Colon of Childhood
Odell, G.	- The Mechanism of Action of Bilirubin and Agar on Small Intestine Transport of Electrolytes and Water
Farrell, P.M.	- Alterations in Lipid Metabolism in Cystic Fibrosis
Pringle, D.J.	- Nutrition, Health and Growth of Indian Children
Pringle, D.J.	- Training of American Indian Paraprofessionals in the Nutrition Education of Diabetic and Obese Clients

Pringle, D.J. - Dietary Intake of Institutionalized Developmentally Disabled Children
Pringle, D.J. - Influence of Meal Frequency on Blood Levels of Glucose, Insulin and Triglycerides
Pringle, D.J. - Factors Affecting Dietary Adequacy of Rural Low Income Families in North Carolina and Iowa
Pringle, D.J. - Nutritional and Health Status of Preschool Children in Eastern Nicaragua
Cassens, R.G. - Nitrites in Meat
Pariza, M.W. - Food Toxicology
Olsen, W.A. - Intestinal Mucosal Functions in Diabetes
Benevenga, N.J. - Methionine Metabolism
Swick, R.W. - Protein Turnover
Elson, C.E. - Intermediary Metabolism
Shrago, E. - Regulation of Cell Metabolism at the Level of Adenine Nucleotide Translocation
Chesney, R.W. - Maturation and Regulation of Amino Acid Transport Systems
Brown, R.R. - Effect of Fat Saturation on Cancer Incidence in Mice
Harper, A.E. - Amino Acid and Protein Nutrition and Metabolism
MacDonald, M. - Control Mechanisms in Gluconeogenesis
Goldfarb, S. - Mechanisms of Regulation of Dietary Constituents on Lipid Synthesis
Ganther, H. - Biochemical Mode of Action of Selenium
Hoekstra, W.G. - Interrelationship of Vitamin E and Selenium

University of Chicago:

Rosenberg, I.H. - Metabolism and Absorption of Monoglutamyl and Polyglutamyl Folate
Rosenberg, I.H. - Enterophepatic Circulation and Absorption of Vitamin D in Gastrointestinal Disease
Coe, F. - Specialized Center on Research in Urolithiases
Hachey, D.L. - Mineral and Trace Metal Research at the Argonne Bioanalytical Center
Kaplan, E.L. - Gastrointestinal Influences on Calcium Homeostasis
Casper, R.C. - Zinc and Copper Status in Anorexia Nervosa
Kirschner, B. - Growth Retardation in Inflammatory Bowel Disease
Landau, R. - Endocrine/Metabolic Evaluation of Jejuno-ileal Bypass for Obesity

Fried, W. - Factors Regulating Hematopoieses-Protein Nutrition
Toback, F.G. - Biochemical Regulation of Controlled Renal Growth
Klein, P. - Metabolism of 13C Compounds and H^2 Breath Tests in Digestive Diseases
Rubenstein, A. - Diabetes Research and Training Center
Wissler, R.W. - Lipid Metabolism and Cardiovascular Disease
Demeester, D. - Cancer and Nutrition
Lindheimer, M. - Volume Homeostasis in Pregnancy
Goldiamond, I. - Behavioral and Social Problems in Obesity and Anorexia
Marcus, J. - Parent-Infant Development Service
Thorp, F.K. - Treatment of Von Gierke's Disease
Rosenberg, I.H. - Diagnosis and Treatment of Children with Aminoacidopathies
Rosenberg, I.H. - Hyperlipoproteinemia, Type 1
Rosenberg, I.H. - Studies on Hypoglycemia
Dawson, G. - Lipid Storage Disease
Kirschner, B. - Evaluation of Growth and Residual Pancreatic Function in Infants and Children Following Subtotal Pancreatectomy
Kirschner, B. - Assessment of Biochemical Abnormalities and Treatment Regiments in Pyruvate Dehydrogenase Deficiency

Columbia University College of Physicians and Surgeons:

Heird, W.C. - Effect of Cysteine and Taurine Supplementation in Parenteral Nutrition in Infants
Winters, R.W. - Effect of Amino Acid Intake in Plasma Amino Acids During TPN in the Term and Post-Term Infant: Formulation and Evaluation of a New Amino Acid Solution
Dell, R.B. - Metabolic Fate of Intravenous Fat Emulsions in Infants
Anderson, T.L. - Effect of Nitrogen and Energy Intake on Nitrogen Balance in Total Parenteral Nutrition
Anderson, T.L. - Effect of Quality and Quantity of Caloric Intake on Nitrogen Balance in Infants Receiving Total Parenteral Nutrition
Winters, R.W. - Net Acid Balance Studies During Total Parenteral Nutrition

Heird, W.C. - Hepatic Dysfunction During Total Parenteral Nutrition

Okamoto, E.M. - Effects of Taurine and Medium Chained Triglycerides in Healthy Low Birth Weight Infants

Nash, M.A. - Net Acid Balance (NAB) in Different Forms of Renal Acidosis in Infants and Children

Winters, R.W. - Growth and Metabolic Variables of Very Low Birth Weight Infants on Combined Enteral/Parenteral Regimens

Pitt, J. - Immunologic Maturation in Breast Fed and Artificially Fed Infants

Anderson, T.L. - Effects of Varying Protein and Energy Intakes on Growth and Metabolism in Low Birth Weight Infants

Rosso, P. - Effect of Maternal Nutritional Status on Fetal Growth and Placental Growth and Function

Heird, W.C. - Normal Somatic Growth and Brain Development of the Beagle Puppy

Heird, W.C. - Effect of Total Parenteral Nutrition on Somatic Growth and on Brain Growth and Development in the Beagle Puppy

Heird, W.C. - Relationship Between Plasma and Tissue Amino Acid Patterns in the Beagle Puppy

Heird, W.C. - In Vitro Studies of Free and Bound Plasma Cysteine

Heird, W.C. - The Role of Colostrum in Intestinal Development

Winick, M. - Adaptation to Chronic Malnutrition in Rats

Morgan, B.L.G. - Carbohydrate Supplementation During Pregnancy and Lactation: A Means of Preventing Behavioral Abnormalities in the Offspring

Winick, M. - Use of Polyamine Levels in Maternal Plasma, Urine and Placenta as Indicators of Fetal Growth

Rosso, P. - Mechanisms of Placental Transport for Water-Soluble Vitamins

Morgan, B.L.G. - The Effects of Cannabinoids Upon Perinatal Brain Development

Rosso, P. - Smoking, Nutrition and Fetal Growth in the Rat

Feldman, C.H. - The Effect of Diet on Drug Utilization in Children

Schulze, K. - The Influence of Metabolic Rate on Minute Ventilation and Apneic Spells in Premature Infants

Schulze, K. - Oxygen Uptake and Delivery in the Respiratory Distress Syndrome

Weiner, M. - Role of Nutritional Support in Pediatric Patients with Malignancies

Dorsey, R.J. - Nutritional Studies of Infants with Congenital Heart Disease

Mansell, A. - Respiratory Failure, Infection Essential Fatty Acid Deficiency and Vascular Permeability

Haddad, G.G. - Metabolic Studies in Aborted SIDS Infants

Nash, M.A. - Nutritional Aspects of Growth Failure in Renal and Genetic Diseases

James, L.S. - The Effect of Maternal Smoking and Maternal Hypertension on Fetal Growth, Fetal Breathing and Fetal Heart Rate Patterns

Winters, R.W. - Relationship of Anthropometric Indices to Body Composition

Heird, W.C. - Role of Quantity and Quality of Protein Intake in Development of Late Metabolic Acidosis

Heird, W.C. - Protein-Sparing Therapy in the Surgical Patient

Anderson, T.L. - Studies of Amino Acid Intake During TPN in Low Birth Weight Infants: Formulation of a New Amino Acid Mixture

Winick, M. - Developmental Study of Fat Cell Growth in Children

Pitt, J. - Effect of Human Milk on Neonatal Host Defense

Winters, R.W. - Quantitative Evaluation of the Methodology of Clinical Studies of Feeding Regiment in the Low Birth Weight Infant

University of Alabama at Birmingham:

Krumdieck, C.L. - Studies on the Biochemistry of Pleroylpolyglutamates

Kang-Jey, Ho - Internal Regulation of Hepatic Cholesterol Synthesis

Fullmer, H. - Studies on Nutrition, Calcification and Caries Prevention

Navia, J.M. - Studies on Vitamin A in Bones and Teeth Calcification

Baggatt, J.E. - Studies on the Biosynthesis of Purines

Hunt, C.E. - Atherosclerosis in New Models of Diabetes Mellitus

Butterworth, Jr., C.D.	- Studies in Nutrition and Cancer, Steroid Hormones, and Oral Contraceptives
Butterworth, Jr., C.D.	- Nutrition Support and Rehabilitation of Cancer Patients
Boots, L.R.	- Role of Selected Coenzymes in Endometrial Function
Laven, G.T.	- Secretory Immune Response in Malnourished Mothers, in Children of Different Ages and Nutritional Status and to Enteric Salmonella Infection
Butterworth, Jr., C.D.	- Malnutrition in Hospitalized Patients
Butterworth, Jr., C.D.	- Development of an Enzyme-linked Immunosorbent Assay (Elisa) for 3-Methylhistidine
Butterworth, Jr., C.D.	- Development of Radio-Bioassay Procedures for the Determination of a Variety of Nutrients in Biological Samples
Butterworth, Jr., C.D.	- Studies on the Biosynthesis of Purines
Butterworth, Jr., C.D.	- Computerized Data Bank and Data Reducation

Memorial Sloan-Kettering Cancer Center/New York Hospital-Cornell Medical Center/Rockefeller University:

Cunningham-Rundles, C.	- Gastrointestinal Absorption of Oral Antigens
Good, R.A.	- Zinc and Immunity
De Cosse, J.J.	- Nutritional Rehabilitation in Head and Neck Cancer
Rivlin, R.S.	- Regulation of Riboflavin Metabolism by Drugs and Ethanol
Ahrens, E.H., Jr.	- Cholesterol-Lipid Metabolism
Kappas, A.	- Nutrition and Pharmacology
Chami, J.	- Pyridoxal Metabolism in Uremia
Curreri, W.	- Nutritional Assessment of Severly Ill Patients
Pinto, J., Rivlin, R.	- Abnormalities in Absorption Transport and Accretion of Zinc by Ethanol and Their Possible Relationship to the Fetal Alcohol Syndrome
Shils, M.	- Nutritional Intervention-Its Effectiveness in Reducing Duration of Hospitalization of Cancer Patients
Albrecht	- Nutritional Aspects of Enzyme Control in Neoplasia
Cunningham-Rundles, C.	- Circulating Immune Complexes in IGA Deficiency

Deschner	- Nutritional Prevention of DMH Induced Tumors
Deschner	- Dietary Modification of MNNG Induced Gastric Neoplasia
Fernandes	- Nutrition and Immunological Function in Diabetic Mice
Fernandes	- Influence of Nutrition on Autoimmunity and Aging
Good	- Nutrition, Immunodeficiency, Lymphocytes and Cancer
Rivlin, R.	- Paradoxical Effects of Ethanol Upon Enhancing Riboflavin Utilization
Rivlin, R., Pinto, J.	- Riboflavin Deficiency, Drug Metabolism and Carcinogenesis
Sarkar	- Effect of Diet on Murine Mammary Tumorigenesis
Gibbs	- Physiological Mechanisms of Satiety
Liebow	- Enteropancreatic Circulation of Digestive Proteins
Liebow	- Pancreatic Control of Histamine
Miester	- Amino Acid and Protein Metabolism
Grinker	- Behavioral and Metabolic Factors in the Development of Obestity
Hirsch	- Metabolic Regulation in Human Obesity
Hirsch	- Regulation of Adipose Tissue Growth and Development

○